FEB. 16
1956

ENGINEERING NEWS-RECORD

★ ANNUAL REPORT AND FORECAST ★

Bright Future, Big Problem

The pride which construction men feel in their calling was never more justified than today in the midst of the biggest boom in their history. Yet two facts about construction's boom times are infinitely more important than the records being broken:

One is that, despite the boom, the demand for the kind of facilities that construction can supply is far from satisfied.

The other is that a dollar buys less and less construction every year.

In the first of these facts is the promise for a bright future, in the second a problem that threatens this future's full realization. Both form the background to this 81st annual report and forecast.

Continued on page 55

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Now you can specify an ARMCO PIPE to meet ANY SEWER PIPE REQUIREMENT

For Corrosion Resistance

Various types of Armco Pipe provide the material durability you need. Plain galvanized for normal service, asphalt-coated for added protection, and for the most severe corrosive conditions you can get the complete protection of Armco ASBESTOS-BONDED. This has a layer of inert asbestos fibers embedded into the zinc coating and sealed with a special saturant.

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Armco PAVED-INVERT Pipe has a tough bituminous pavement in the lower quarter—where the wear is most severe. This provides a balanced design for extra service life.

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more PRODUCTION-BOOSTING FEATURES

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Plus one-piece tubular frame, tandem drive, real operator comfort, hydraulic blade lift.

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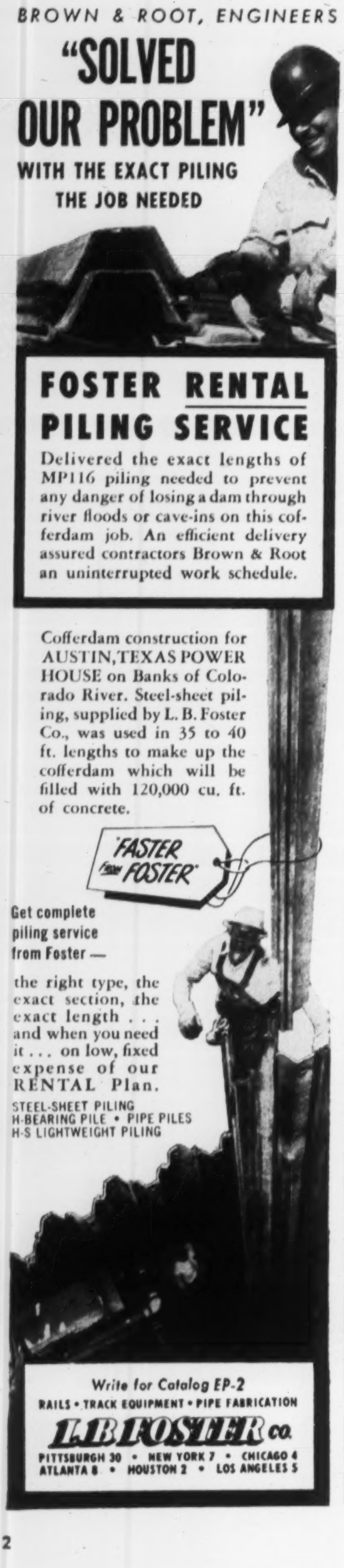

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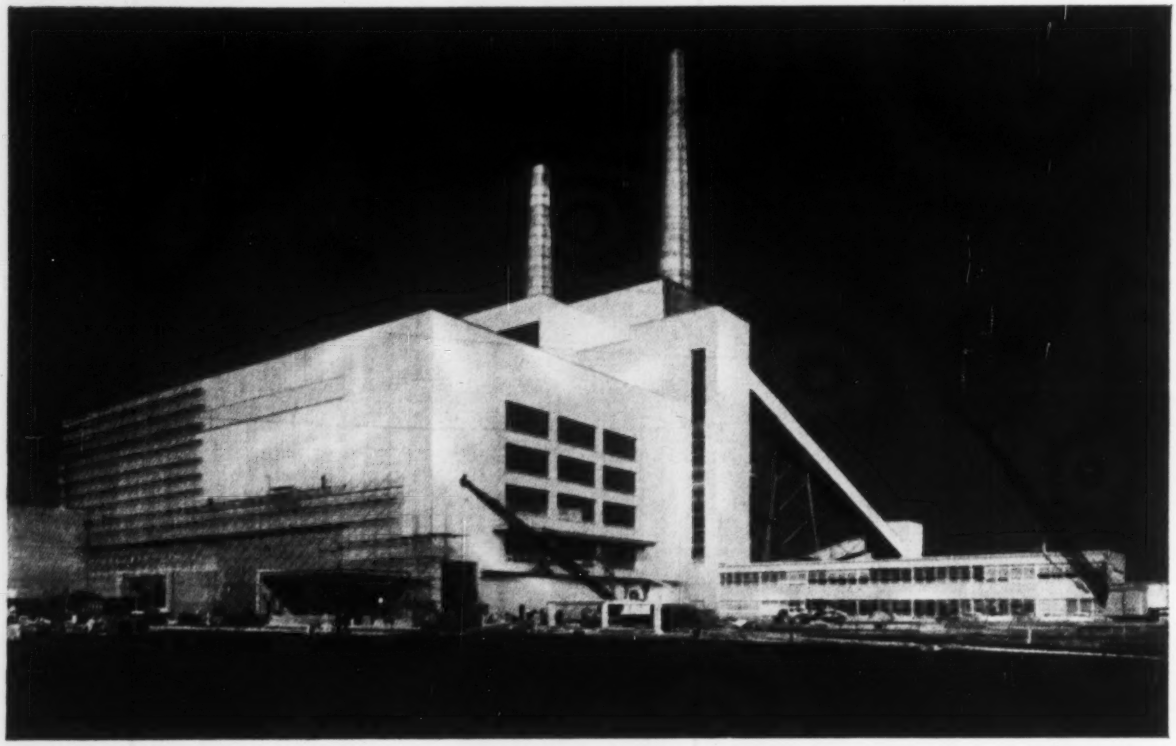
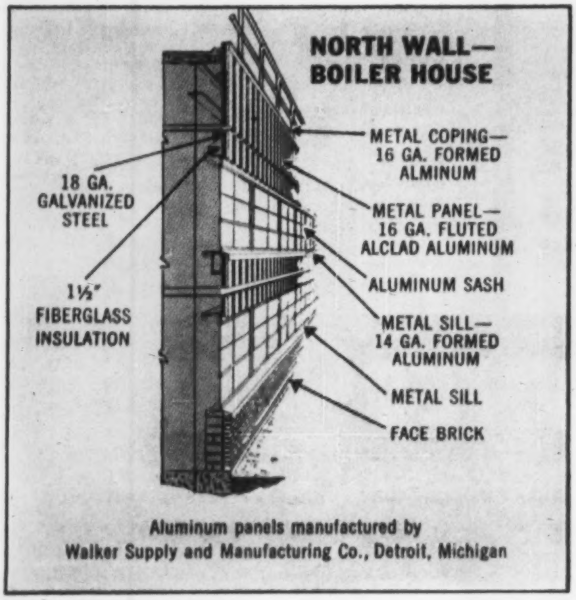
Detroit Edison estimates big



Detroit Edison Company's new generating station at River Rouge, Michigan—constructed with outside walls made of Kaiser Aluminum selected and fabricated by Walker Supply and Manufacturing Co., Detroit, Michigan. This unique design reduces structural steel tonnage, foundation requirements and maintenance costs.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ALCLAD ALUMINUM
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FIBERGLASS
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METAL SILL—
14 GA. FORMED
ALUMINUM
METAL SILL
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Insulation Coverings made of Kaiser Aluminum protect insulating materials from moisture and mechanical damage. Resist corrosion. Won't rust. Give long service without painting and with virtually no maintenance. Aluminum coverings also provide high reflectivity, low emissivity for greater protection against heat loss. Light weight reduces handling and transportation cost.

savings by the use of lightweight aluminum walls!

THE Detroit Edison Company selected light, strong aluminum sheet and extrusions for the outside walls of their new generating station at River Rouge, Michigan.

This unique, lightweight wall design allows an 8,000-ton reduction in total weight and reduces structural steel and foundation requirements—as compared to the 12″ masonry curtain-type walls used in previous plants.

Another important reason aluminum was selected for this job is its high resistance to corrosion—especially necessary in the industrial atmosphere of the River Rouge site. Result: maintenance on the exterior walls is kept to a minimum.

As a basic producer of aluminum, our efforts are dedicated to the job of helping to improve building products and to reduce their costs.

We will gladly share with you to the fullest our fabricating and engineering skills. Or for names of building products manufacturers who will be glad to work with you, contact the Kaiser Aluminum sales office listed in your telephone directory. Kaiser Aluminum and Chemical Sales, Inc., *General Sales Office,* Palmolive Bldg., Chicago 11, Ill.; *Executive Office,* Kaiser Bldg., Oakland 12, Calif.

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More ways to cut costs with aluminum building products!

Kaiser Aluminum Shade Screening keeps buildings as much as 15° cooler under the hottest summer sun. This reduces the load on air conditioning equipment—thus reducing operating costs. The 17° angle of the louvers blocks direct rays of the sun, yet provides glare-free light.

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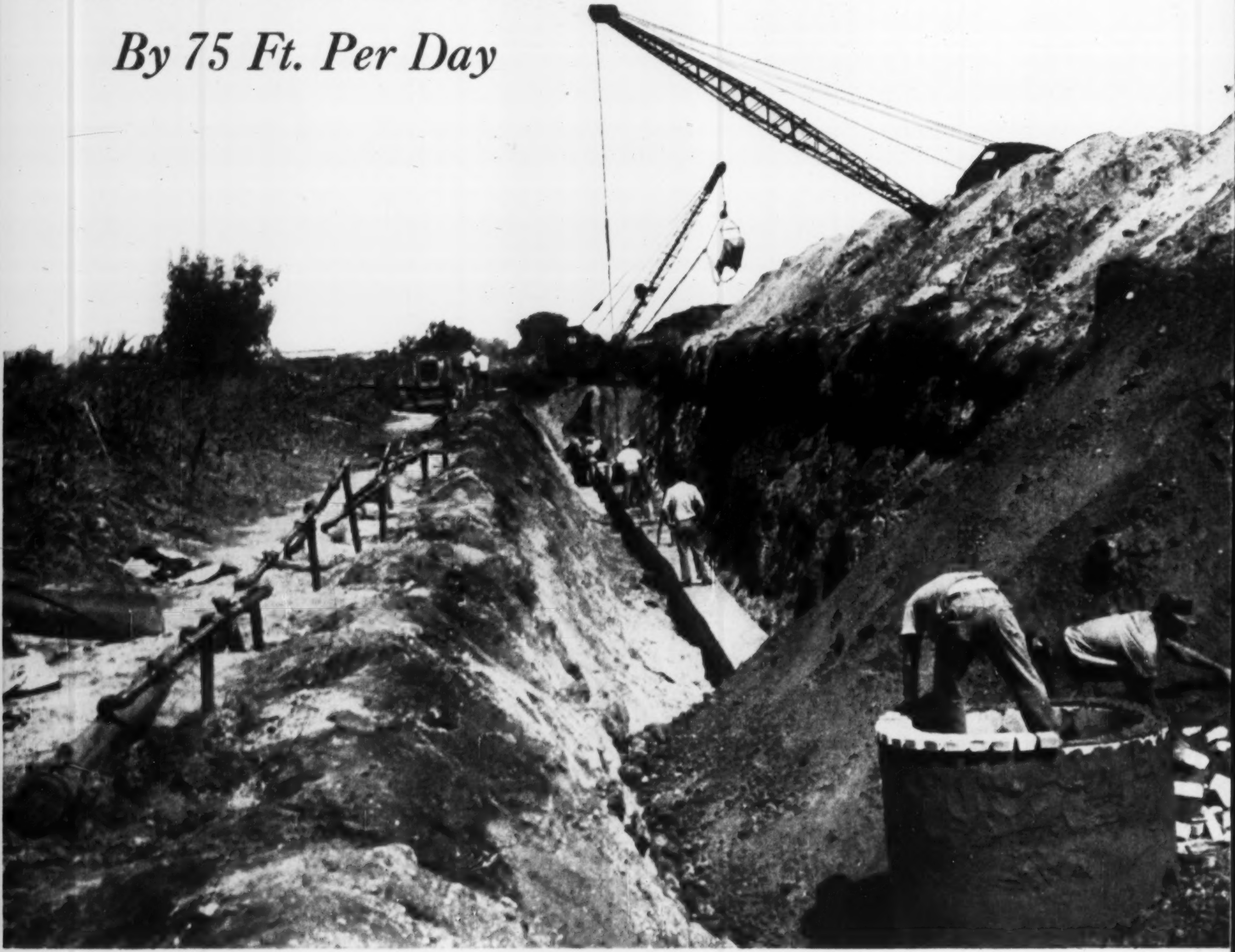

15" Interceptor Sewer encased in concrete — Rockford, Illinois

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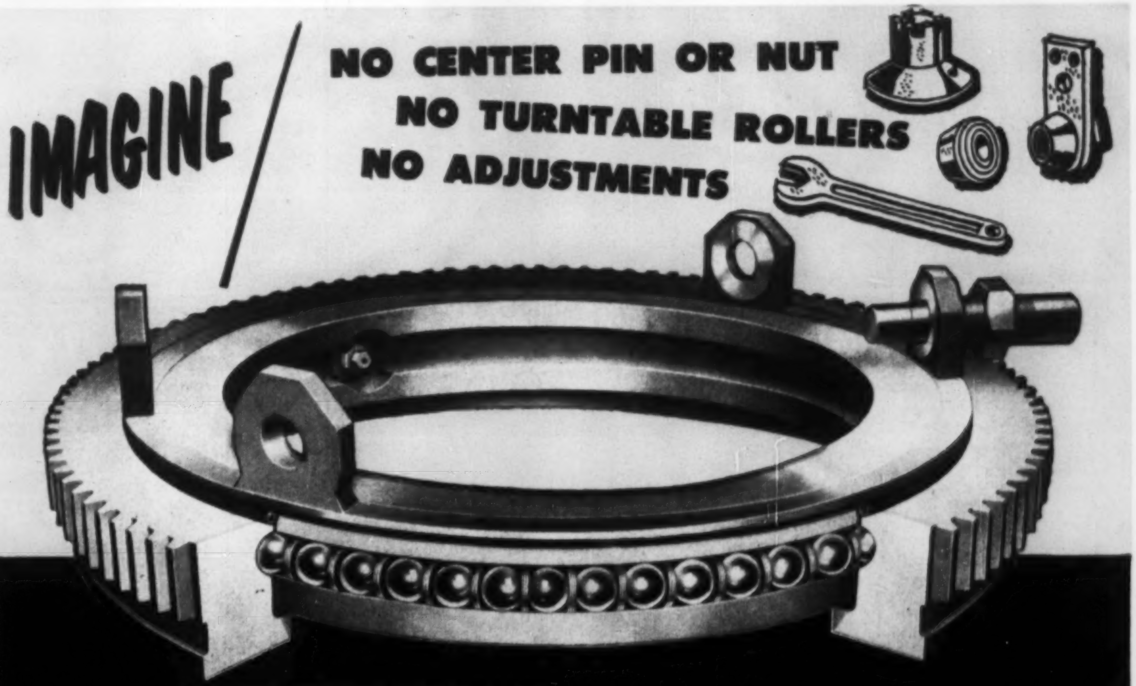

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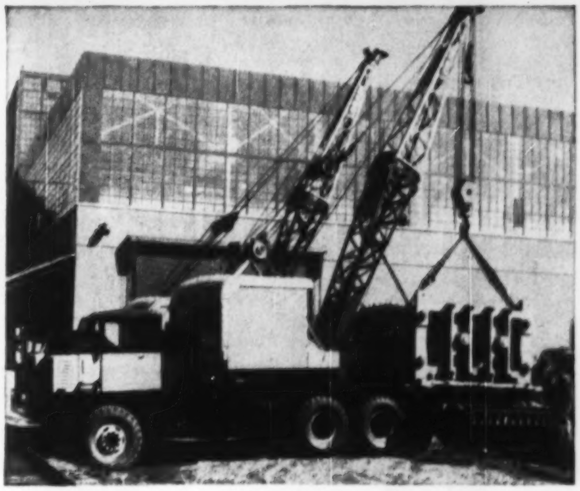

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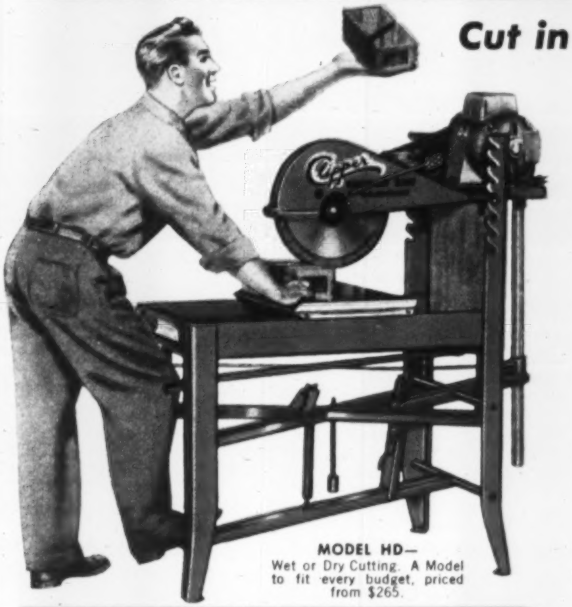

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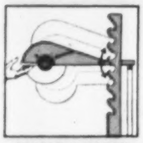

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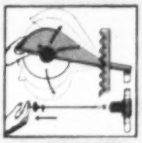

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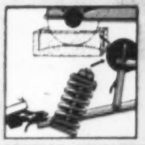

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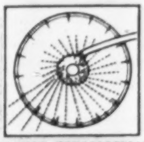

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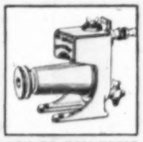

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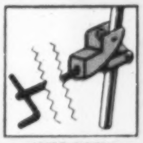

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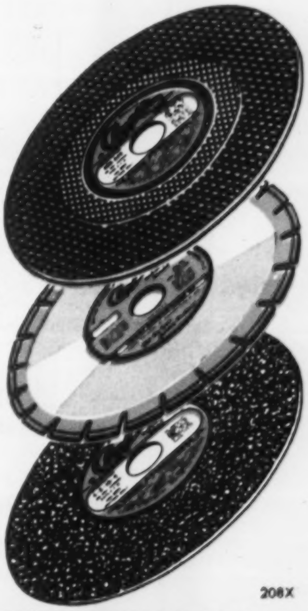

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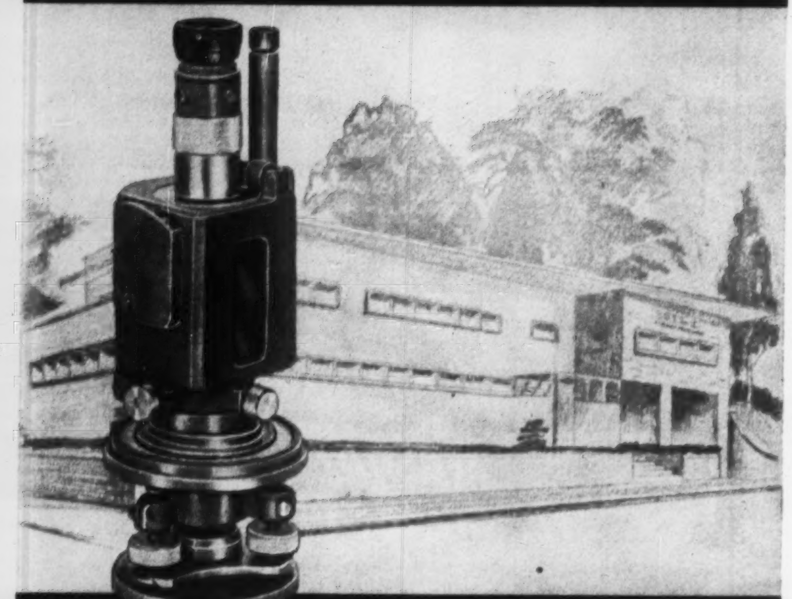

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Reader Comment

Unity—EJC and NSPE

SIR—The editorial, "EJC Scores on Unity," (ENR Dec. 22, 1955) was naturally of great interest to those of us who have been concerned about the over-all question of the unity of the engineering profession.

Indeed, EJC is to be commended and congratulated for its sponsorship of the highly-successful Nuclear Engineering and Science Congress. As you indicate, this is probably the high point, in recent years, at least, in the coordination of technical engineering and science activities and should stimulate more joint technical meetings involving subjects which cut across the several branches of engineering.

There is another lesson to be derived, however, from the EJC achievement. This is as an illustration of the distinction which the National Society of Professional Engineers has made throughout the long unity discussions —that EJC can and should fill the role of coordinating body for technical activities, while NSPE serves as the vehicle to represent all professional engineers, regardless of technical specialization, in non-technical matters.

If this point is added to your editorial comment, we will then have the acceptance of the basic principle, with a strong example to accompany it, of how the unity of the engineering profession can be achieved in the two equally important aspects of technical advancement and professional development.

ALLISON C. NEFF
President, National Society of Professional Engineers
Middletown, Ohio

Dams Are Not Enough

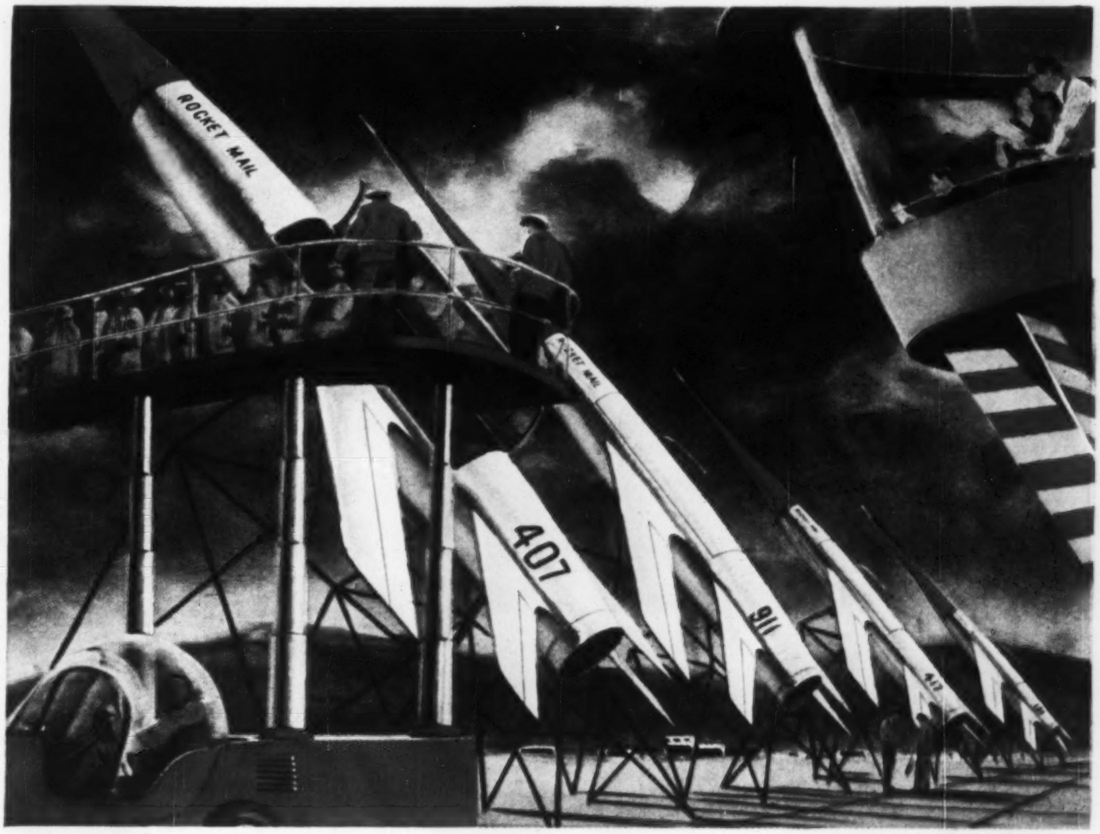
SIR—I should like to make a contribution in regard to the heavy, destructive floods in Northern California —the worst on record for that region.

A government pamphlet entitled "Climatic Fluctuations for the Western Ranges," published in 1936,

(Continued on page 14)

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

Letters should be addressed: Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



RADAR controlled and guided, high speed rockets streaking through the stratosphere may deliver New York mail to San Francisco in less than an hour!

100 years from now...

WE MAY SEND MAIL BY ROCKET!

A century from now a wonderful, exciting and different world. But there will be one familiar note. The cast iron pipe laid today will still be carrying water and gas to the homes and industries of tomorrow.

In over 60 American cities, these dependable cast iron water and gas mains, laid more than a century ago, are still serving efficiently. And modernized cast iron pipe, centrifugally cast, is even stronger, tougher, more durable.

U. S. Pipe is proud to be one of the leaders in a forward-looking industry whose service to the world is measured in centuries.

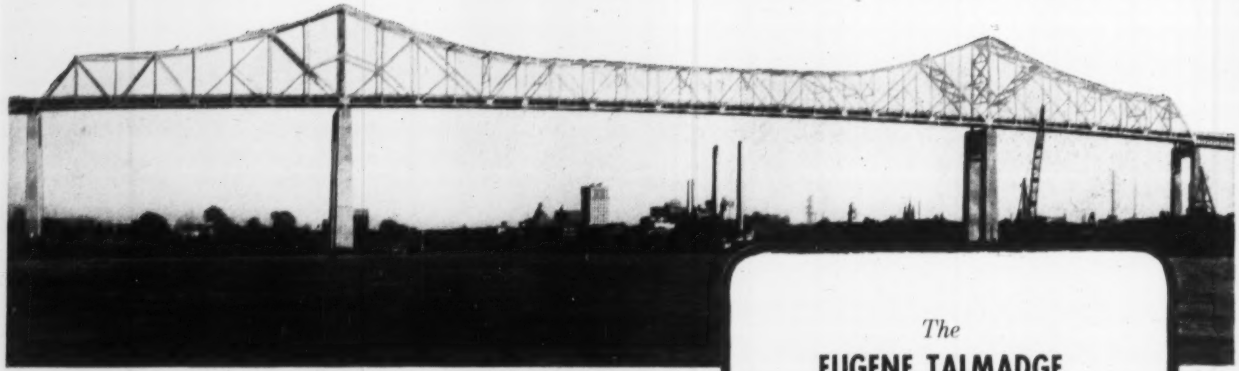
U.S.
cast iron
PIPE
FOR WATER, GAS, SEWERAGE
AND INDUSTRIAL SERVICE
CAST IRON

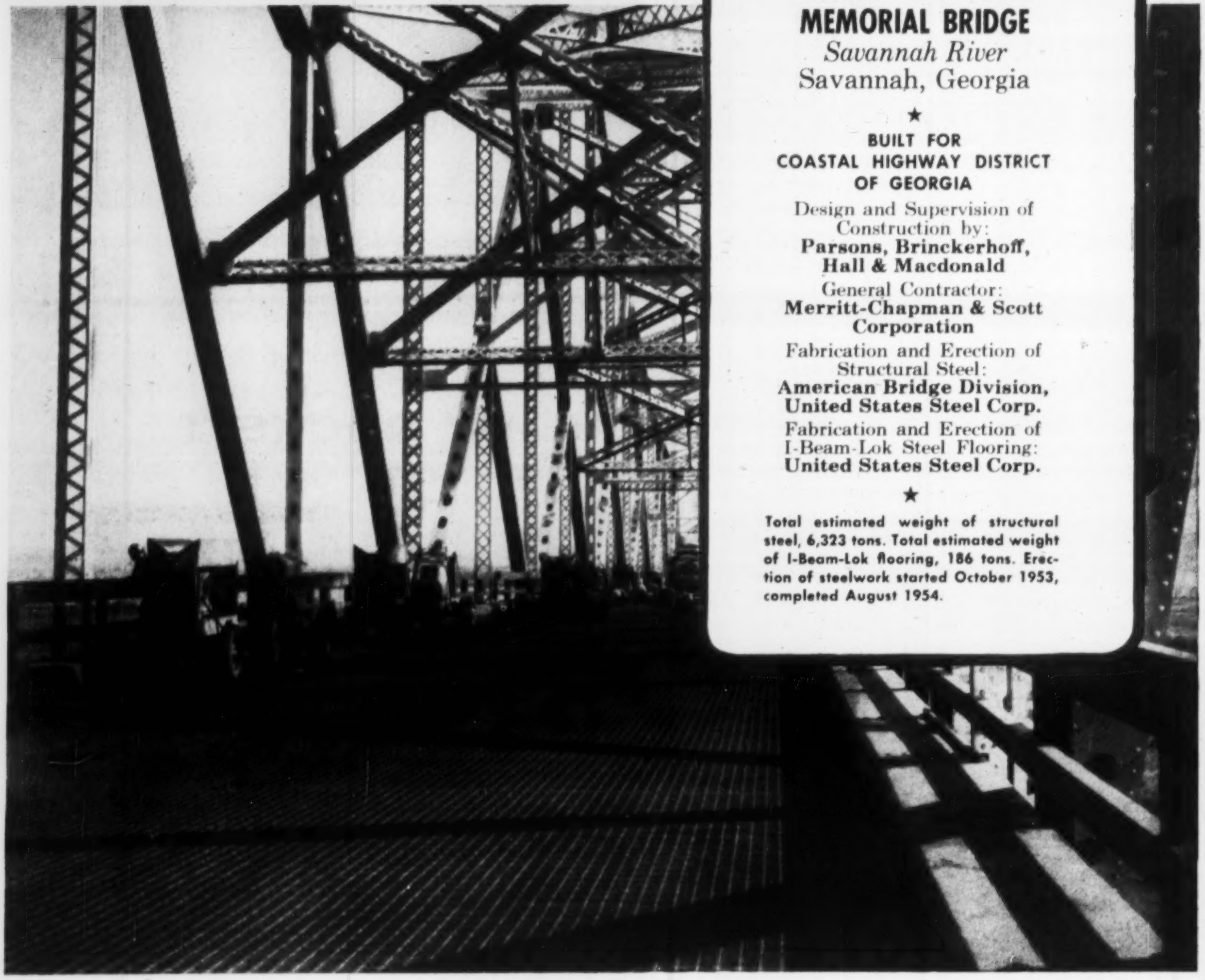
U. S. PIPE AND FOUNDRY COMPANY, General Office: Birmingham 2, Alabama

A WHOLLY INTEGRATED PRODUCER FROM MINES AND BLAST FURNACES TO FINISHED PIPE.

On 710-ft. main span of this high level

Open type USS I-BEAM-LOK





The

EUGENE TALMADGE
MEMORIAL BRIDGE
Savannah River
Savannah, Georgia

★

BUILT FOR
COASTAL HIGHWAY DISTRICT
OF GEORGIA

Design and Supervision of
Construction by:
Parsons, Brinckerhoff,
Hall & Macdonald
General Contractor:
Merritt-Chapman & Scott
Corporation
Fabrication and Erection of
Structural Steel:
American Bridge Division,
United States Steel Corp.
Fabrication and Erection of
I-Beam-Lok Steel Flooring:
United States Steel Corp.

★

Total estimated weight of structural steel, 6,323 tons. Total estimated weight of I-Beam-Lok flooring, 186 tons. Erection of steelwork started October 1953, completed August 1954.

cantilever bridge...

steel flooring

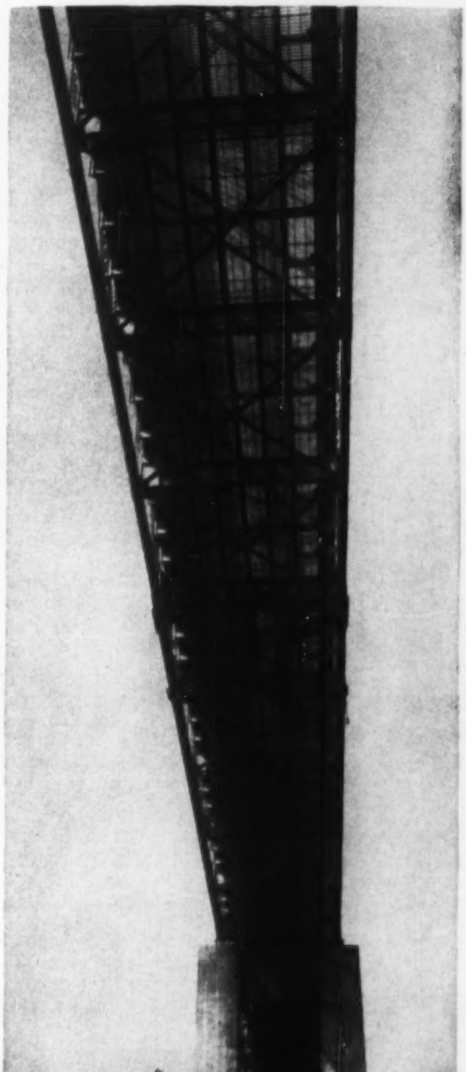
reduced deadload stress

approx. 30%

A recent and interesting example of American Bridge workmanship is the 6,034-foot structural steel section of the long Eugene Talmadge Memorial Bridge over the Savannah River, at Savannah, Georgia.

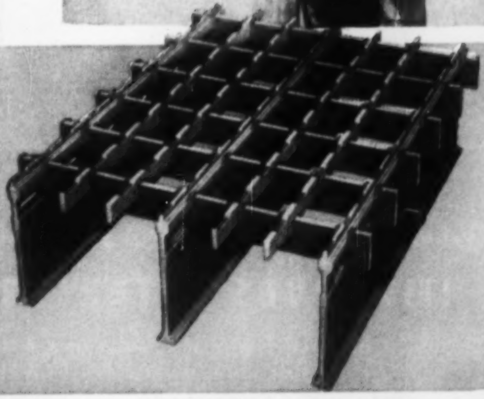
Fabricated and erected by American Bridge, this high-level main bridge comprises a 1,268-foot Through Cantilever Truss structure with a central span of 710 feet, and two anchor spans, each 279 feet long. Approaches are deck plate girder spans, 2,148 feet, and 2,618 feet in length respectively.

The use of lightweight USS I-Beam-Lok open type steel flooring for the two-lane 28-foot roadway on the 710-foot channel span resulted in substantial reductions in deadload stresses throughout the trusses. This permitted the adoption of comparatively short anchor arms, and made possible large savings in the total weight of steel. For example, the stress in the top chords over the main pier is approximately thirty percent less than it would be if a concrete deck were used on the channel span.



USS I-BEAM-LOK ... the heavy-duty steel flooring for modern traffic

USS I-Beam-Lok open type steel flooring is available in units measuring 6'2" in width and up to 49' in length. With its strong, full 5" depth, it can be applied directly to stringers on spans up to 4' centers to permit H20-S16 loadings. Open Type I-Beam-Lok does not require secondary supports. It combines weight savings and reduced costs with roadway rigidity, ease of erection, and low maintenance costs. For more information about the time-and-money saving advantages of this superior lightweight steel flooring in bridge construction, contact the sales office nearest you, or write direct to our Pittsburgh headquarters.



AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS I-BEAM-LOK

USS

UNITED STATES STEEL

JOT NAME, TITLE AND ADDRESS IN THIS SPACE
TO START YOUR FREE "NELWELDER" SUBSCRIPTION

The rest of the cover girl appears on the March NELWELDER, industry's magazine of stud welding.

another way of saying.. **STUD WELDING IMPROVES EXTERIOR DESIGN**

Product designers and architects can smooth out the contours of many a rough exterior by employing the NELWELD® method of fastening. Numerous innovations in stud fastening which eliminate unsightly projections such as bolt heads, and costly bosses and flanges, are published monthly in the NELWELDER. Get in the swim—mail the top of this advertisement to receive your first free issue of the NELWELDER.

NELSON STUD WELDING
Division of Gregory Industries, Inc.
LORAIN, OHIO

points out that California enjoyed considerably more rain in previous decades, and the recordings begun in 1850 give evidence of a definite downward trend of rainfall.

How is it then that with less rain we now have greater floods, despite the hundreds of dams that have been built since that time to control the flow of water?

To the keen observer it is crystal clear that our floods stem mainly from the following causes:

1. Deforestation and denudation of our land, including forest fires.
2. Paving and draining of large areas throughout the continent.
3. The loss of one billion tons of topsoil annually through soil erosion, rendering the land less able to retain the raindrop where it falls.
4. Failure to stop erosion and replenish the soil losses.
5. Failure to divert the runoff during floods into the subsoil where it belongs.

Recent literature estimates that 10,000,000 acres of timberland are harvested annually throughout the U. S. On the other hand, replanting is moving at a snail-like pace. In 1953 for example, only 716,000 acres were replanted and the acreage in previous years was even less.

Forests and their subsoils are natural water reservoirs. In some cases, forest floors can hold twice their own weight in water.

According to a bulletin of the U. S. Forest Service, an average of 200,000 forest fires burn and char an estimated 30 million acres of woodland annually. Since forests are of such inestimable value in flood control, why do we keep decimating them at this pace?

Towns, cities, airports, highways, industrial developments, etc. encroach on forest and farmland in appalling strides. These are all paved, impervious areas which put an end to the infiltration of rainwater into the ground. Today an estimated 105,000,000 acres are man-made "drainboards" where runoff is always at an optimum.

Instead of flooding our valleys and our bottomland with runoff water, diversion of flood water into the subsoil by means of intake pits would not only alleviate the floods but also replenish the underground water reservoir.

An estimated one billion tons of topsoil are washed into rivers and oceans annually. Topsoil, being rich in humus, is water absorbent like blotting paper and able to retain a great deal of water if protected from erosion.

(*Continued on page 20*)

Here's why YOU GET A FASTER... MORE THOROUGH MIX

in a MADSEN ASPHALT PLANT

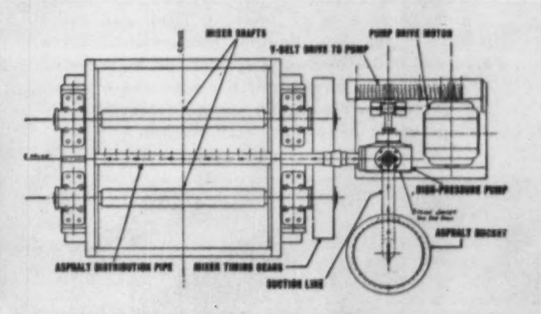
MADSEN MODEL 481 ASPHALT PLANT

A faster and more thorough mix is only one of the many advantages MADSEN gives you in the outstanding Model 481. More than 25 big features are built into this fine plant. Some of them reduce operator fatigue, some reduce the cost of maintenance... others are designed to give the plant easier accessibility. But they all add up to the fact that the MADSEN Model 481 is the logical asphalt plant to handle today's competitive highway and airport jobs with a wider margin of profit for the operator. Get the full story on the MADSEN Model 481 ...ask your MADSEN Distributor for Bulletin No. 800.

PATENT PENDING

MADSEN MODEL 440 TWIN-SHAFT PUG MILL MIXER

Here is the mixer that sets the pace in the asphalt paving industry. Precision-built mixer gate operating cylinders available for either steam, hydraulic or air operation—provide fast, efficient action. The extra-large discharge gate, the pressure mixing through the paddle arrangement, and the patented shank design... all help to assure a discharge time of approximately 4 seconds regardless of batch size. MADSEN Pug Mills, famous in the industry for more than 30 years, have been a vitally-important factor in making MADSEN Asphalt Plants leaders for fast mixing and greater daily tonnage.



Plan view of the MADSEN Asphalt Injection System

MADSEN ASPHALT PRESSURE INJECTION SYSTEM

(PATENTED)

Here is the fastest known method of placing every drop of required asphalt into the pug mill. The asphalt is pumped into the mill in 5 to 7 seconds... not by gravity, and not to the sides of the mill, but directly in the center of the pug mill where it is distributed uniformly. Complete control of asphalt distribution eliminates wet and dry spots. The quick, clean discharge of asphalt into the mill with a sharp, fast injection, sets the tempo for a faster mix — a more thorough mix.

Equipment that Serves

MADSEN PRODUCTS
FOR THE ASPHALT PAVING INDUSTRY

ASPHALT PAVING PLANTS—1000-lbs. to 6000-lbs. BATCH CAPACITY
PUG MILL MIXERS • AGGREGATE DRYERS
DUST COLLECTOR UNITS • ASPHALT TANKS
ROAD PUG TRAVEL MIX PLANTS • WEIGH BATCHERS
ROYAL CROWN PUMP VALVES • ASPHALT AND FUEL PUMP UNITS
SUPER FLOAT AND JOHNSON FLOAT FINISHERS

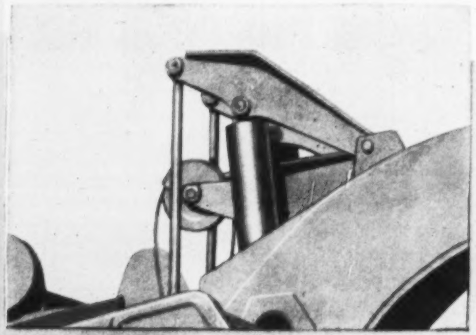
CONSTRUCTION EQUIPMENT DIVISION

MADSEN WORKS
CONSTRUCTION EQUIPMENT DIVISION
Baldwin-Lima-Hamilton Corporation
14120 E. ROSECRANS AVE.
P. O. BOX 38, LA MIRADA, CALIFORNIA, U.S.A.

MORE WORKABILITY WITH

ACCESSIBILITY

Accessibility of major components is a cost saving feature of these two new Euclid Scrapers. Easy servicing and maintenance means more working time and more payloads per day. Engine, transmission, drive axle and entire hydraulic system can be serviced or replaced in about half the time required on other scrapers. Illustration shows accessibility of the Torqmatic Drive in the S-18 Scraper.



ADVANCED DESIGN

Euclid's advanced design does away with cable headaches—costly downtime for replacement and repair. All scraper operations . . . bowl, apron and ejector . . . are actuated by husky levers with independent hydraulic control. They're fast and positive . . . not interconnected in any way. All four hydraulic jacks are interchangeable . . . one spare fits anywhere!

Performance that gets More Work Done!

CUTTING BLADES

The cutting blade is another reason you can count on lower maintenance costs with "Euc" Scrapers. All four sections are identical and reversible. By using a straight or drop center blade arrangement you get the most efficient loading under any job condition. Reversing or interchanging the sections . . . a very easy operation . . . provides a completely new cutting edge.

The S-12 has plenty of power and traction to pick up heaped loads in a hurry, even in sandy conditions like this.

With Torqmatic Drive and 300 h.p., the S-18 hauls heaped loads up to 24 cu. yds. at fast travel speeds . . . dumps on the fly.

NEW "EUC" SCRAPERS

THE S-12

12 yds. struck . . .

14 yds. at 3:1 slope . . . 16 yds. heaped at 1:1 . . . 26.5 x 25 tires . . . 218 h.p. . . . top speed loaded of 28 mph. . . . 9′ 6″ width of cut . . . makes non-stop 180° turn in 31′.

AND THE S-18

These two new Euclid Scrapers bring you a new high in scraper performance and low cost yardage. Both incorporate the advanced design that have made "Euc" Scrapers the fastest growing line in the industry. With lever action and 4 section cutting blades, and 16 to 18 h.p. per yd. of capacity, they load easy and travel fast. The entire power train of the S-12 and the S-18 is designed for exceptionally good accessibility.

Before you decide on any scraper for your present or future work, check the money saving features of these "Eucs". Your Euclid dealer will be glad to give you facts and figures that show why so many users have found that ***Euclids are your best investment.***

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

18 yds. struck . . .

21 yds. heaped at 3:1 slope . . . 24 yds. heaped at 1:1 . . . 27.00 x 33 tires . . . 300 h.p. . . . Torqmatic Drive with torque converter and semi-automatic transmission . . . top speed of 20 mph with full payload . . . 10′ width of cut . . . makes non-stop 180° turn in only 36′.

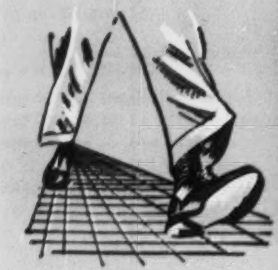
EUCLID

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM
MORE POWER FOR YOU

WHERE SAFE WALKWAYS COUNT...



Gary

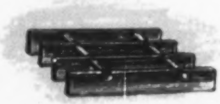
provides tailor-made, extra strong, safe walkways . . .

WELDED OPEN STEEL FLOORING

In appearance, design, construction—Gary Welded Grating is outstanding for all open steel flooring and stair tread installations. One piece construction, with main bearing bars and *hexagonal cross bars*, resistance-welded means stronger, longer lasting flooring. Tops of all bars are flush and it is self-cleaning, providing the utmost in safety. Main bars on 1³⁄₁₆″ centers and cross bars on 4″ centers, in panels 36″ wide and lengths to 40′0″. Also available in a variety of special types with spacing of bars to suit your requirements. Gary Welded is tailor-made, factory-fabricated to your specifications—a big saving for you in installation time and expense. For illustrations of Gary Grating and Stair Treads in use and complete description of all Gary products, send for Catalog E-26.

Standard Steel Spring Division

ROCKWELL SPRING AND AXLE COMPANY
4004 East Seventh Avenue • Gary, Indiana



FREE SAMPLE

Write us on your company stationery. We'll send handy paper weight size sample.

A Timely Word to Drafting Department Heads...

NOW* Is the Time to Get Your New Modern Bruning Copyflex Machine!

*** Because you'll need greater print-making capacity to meet the push for more drafting room output!**

*** Because your old reproduction unit can't keep pace with increased demands!**

*** Because, with management's desire for greater production, you can justifiably include new equipment in your capital expenditure program.**

NEW COPYFLEX MODEL 500

A new, ultra-fast, heavy-volume machine offering top mechanical speed of 40 f. p. m., automatic separation, front or rear delivery, automatic stacking, and a host of other advanced features.

You Need It! The boom in production means more pressure than ever for engineering prints. Modern Copyflex will help you deliver them! New, better-than-ever models bring you faster reproduction speed and a host of operator conveniences to step up production.

You Want It, Surely! Take this opportunity to replace that old, inadequate unit with efficient, trouble-free Copyflex—no exhaust venting, no plumbing or auxiliary equipment, no installation other than an electrical connection.

You Can Get It! Chances are that your firm, like most others, is gearing up for greater-than-ever production. You couldn't pick a better time to include new, higher-production equipment in your program. There's a new, improved Copyflex model to suit every price and production requirement. Mail coupon today. You'll be glad you did!

Three Other New, Improved Copyflex Models

Model 250. Newest and finest of its size. Takes less than a sq. yd. of floor space. Up to 25 f. p. m. speed —18½" printing width. Automatic stacking and separation.

Model 35. Provides up to 30 f. p. m mechanical speed and a full 46-inch printing width for heavy volume reproduction — at a thrifty, low price.

Model 100. The helper your big machine needs. Makes up to 300 prints of one or many different 8½" x 11" originals per hour—at less than 1¢ each for materials.

BRUNING
Copyflex

Best Process! Best Machines!
Best Selection of Materials!

Specialists in Copying Since 1897

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In Canada: Charles Bruning Company (Canada) Ltd., 105 Church St., Toronto 1, Ont.

Charles Bruning Company, Inc., Dept. 23-M
4700 Montrose Ave., Chicago 41, Illinois

Please send me information on Copyflex process and ____Model 500 ____Model 250____Model 35____Model 100.

Name ____________________ **Title** __________
Company ____________________
Address ____________________
City __________ **County** ________ **State** ________

Gurley | ***Current Meters for measuring stream velocity in:***

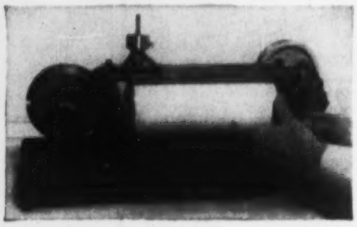
Fresh water—rivers, streams, canals, lakes

Salt or brackish water—with a newly-designed salt water model

Shallow or sluggish streams—with the Pygmy Current Meter

Industrial waste and sewage—where solids permit ...the Gurley Current Meter is made of non-corroding materials.

Gurley Current Meters have been the standard of the profession since 1870. Highly-standardized, easily-disassembled for cleaning...simple, precise and rugged. Write for "Gurley Current Meters" (Bulletin No. 700).



Gurley Graphic Water Level Recorders

Continuous record on graph chart for 24 hours or 8 days. Positive response to fluctuation by float, perforated tape and sprocket wheel. Finest quality "Chelsea" marine clock. Metal base and cover. Made of non-corrosive materials throughout. Ranges 1 to 40 ft., or 30 cm. to 12 meters.

Use Gurley Graphic Water Level Recorders when you need dependable records of reservoirs, hydro plants, sewers and sewage systems, irrigation and stream gaging. *Write for Bulletin No. 50 and details on Gurley Water Level Recorders.*

GURLEY

W. & L. E. GURLEY HYDRAULIC INSTRUMENTS DIVISION
TROY, N. Y.

Gurley—Since 1845

. . . Reader Comment

The loss of so much topsoil renders our land progressively less able to absorb the rains, hence more and more runoff water is flooding our creeks, rivers and valleys. It is quite obvious that humus-rich, protected soil is an ultimate factor in flood control.

Contour ploughing is not enough to stop runoff and soil erosion. Our soil protection methods are still inadequate. The humus is vanishing from our soils at a fast pace. On the whole we are poor humus managers.

Most of our organic discards are still dumped into rivers and oceans or burned in incinerators or backyards. Our organic waste outlets have not been put to proper use in our soil conservation efforts. An estimated 400 million tons of humus could be retrieved from our organic discards annually if collection and procession of same were properly and universally organized.

Before the long-range flood control measures as outlined above can take root and become effective, transient measures must be resorted to. Runoff water can in most cases be diverted into the subsoil wherever it accumulates, by means of intake pits or wells which are placed in creeks, riverbeds and bottomland. Such pits should be driven to pervious strata such as sand, gravel, peat, fissured rock, etc. into which the floodwaters would be syphoned.

It is evident that dams are not enough to control floods.

FRANK D. STEINER
Civil Engineer
Orinda, Calif.

CALENDAR

National Society of Professional Engineers, annual spring meeting, Mayflower Hotel, Washington, D. C., Feb. 17-18.

American Concrete Institute, annual convention, Bellevue-Stratford Hotel, Philadelphia, Pa., Feb. 20-23.

American Concrete Pipe Association, annual convention, Broadmoor Hotel, Colorado Springs, Colo., March 6-10.

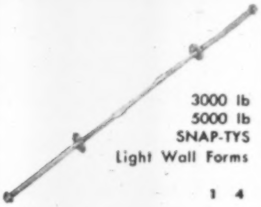
Fifth Inter-American Sanitary Engineering Congress, Lima, Peru, March 19-25.

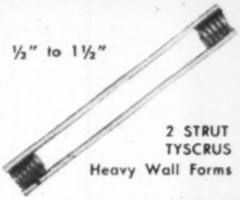
Purdue Industrial Waste Conference, Purdue Memorial Union, Lafayette, Ind., May 15-17.

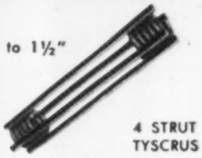
Prestressed Concrete Institute, second annual convention, Hollywood Beach Hotel, Hollywood, Fla., May 16-18.

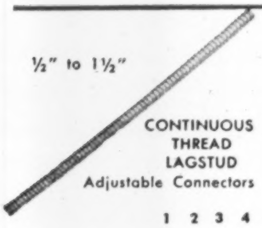
RICHMOND REFERENCE GUIDE FOR YOUR CONCRETE CONSTRUCTION NEEDS

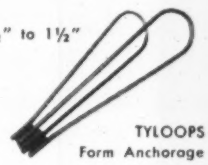
CUT OUT AND FILE

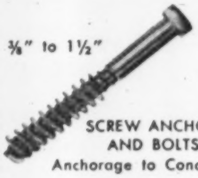

3000 lb
5000 lb
SNAP-TYS
Light Wall Forms
1 4

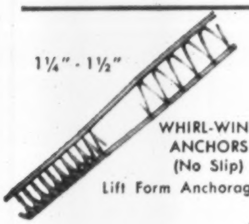

½" to 1½"
2 STRUT
TYSCRUS
Heavy Wall Forms
1 2 3 4

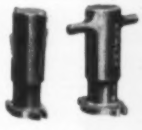

1" to 1½"
4 STRUT
TYSCRUS
Mass Concrete Forms
2 3


½" to 1½"
CONTINUOUS
THREAD
LAGSTUD
Adjustable Connectors
1 2 3 4

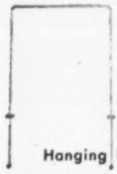

½" to 1½"
TYLOOPS
Form Anchorage
3

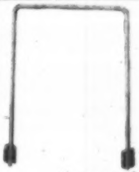

⅜" to 1½"
SCREW ANCHORS
AND BOLTS
Anchorage to Concrete
2 3

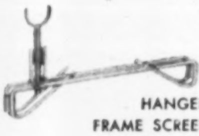

1¼" - 1½"
WHIRL-WIND
ANCHORS
(No Slip)
Lift Form Anchorage
3

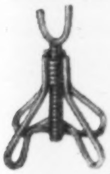

¼" to ¾"
THREADED INSERTS
Fastening to Concrete
1 2 3 4

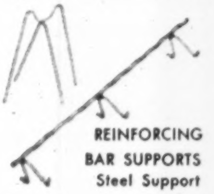
⅝" - ¾"
PEERLESS WEDGE INSERT
Shelf Angle Support
1

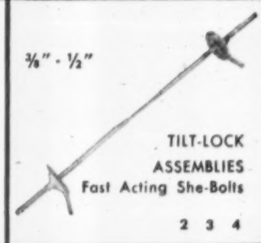

SNAP-TY
HANGER
Hanging Light Forms
1 4

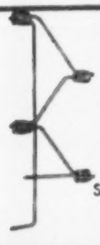

½" to 1
TYHANGER
Hanging Heavy Forms
1 2 4

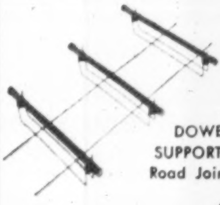

HANGER
FRAME SCREED
Form Hanging
and Screeding
2

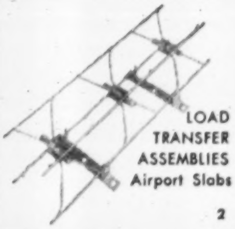

ADJUSTABLE
SCREED CHAIR
Screeding Slabs
1 2 4


REINFORCING
BAR SUPPORTS
Steel Support
1 2 3 4


⅜" - ½"
TILT-LOCK
ASSEMBLIES
Fast Acting She-Bolts
2 3 4


TYFRAME
Stadium Forms
1


DOWEL
SUPPORTS
Road Joint
2


LOAD
TRANSFER
ASSEMBLIES
Airport Slabs
2

buildings ①

roads & bridges ②

tunnels & dams ③

water & sewage PLANTS ④

The above is a partial showing of the 358 items contained in the Richmond line of engineered concrete form-tying devices, anchorages and accessories—the largest line in the field. All items are designed for specific uses, not only for the fields pictured above but also for the building of *stadiums, grand stands, auditoriums, retaining walls, curtain walls, silos, etc.*

Whatever your concrete construction needs, contact Richmond. Richmond products are engineered to give you extra strength, ease of handling, utmost economy. Write for complete catalogue. If you have a specific problem, Richmond's Technical Division or field service men will be glad to submit drawings, engineering data and proposals. Address:

RICHMOND SCREW ANCHOR CO., INC. — 816 Liberty Ave., Brooklyn 8, N. Y. and
315 South Fourth St., Saint Joseph, Mo.

INSIST ON RICHMOND
... AND BE SURE IT'S RICHMOND!

Richmond
SCREW ANCHOR CO., INC

816-838 LIBERTY AVENUE · BROOKLYN 8, N. Y.
315 SOUTH FOURTH ST · ST JOSEPH MO

RICHMOND REFERENCE GUIDE
FOR YOUR CONCRETE
CONSTRUCTION NEEDS

For faster job-cycles
make it 2-Cycle Power

SPECIFY
GENERAL MOTORS
DETROIT DIESEL

in all your construction equipment

MODERN 2-cycle design is the main difference between GM Detroit Diesels and most other Diesels built today.

Two-cycle design means power on every piston downstroke. This is one of the reasons why a GM Detroit 2-cycle Diesel accelerates faster, responds to governor controls quicker, takes sudden shock loads in stride.

That means more work per shift from your equipment—means you can handle bigger contracts with fewer units, keep your capital investment down and your profits up.

But you get more than faster work when you *specify* GM Detroit Diesel power.

You get engines that are easy to service and maintain, that help you keep parts stocks low because of the high degree of parts interchangeability. You get engines that start at the push of a button with no auxiliary, even in wet weather and when it's cold.

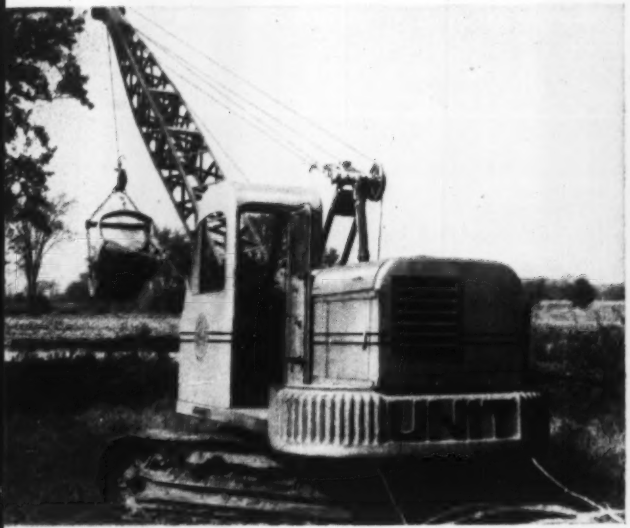
And you get Diesel engines backed by a network of GM Detroit Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts where and when you need them.

Today you can specify GM Detroit Diesel power in over 1000 applications of equipment built by more than 150 manufacturers. Get their names from your local GM Diesel distributor or write direct for the list.

"QUICK SERVICE WHEN I NEED IT"

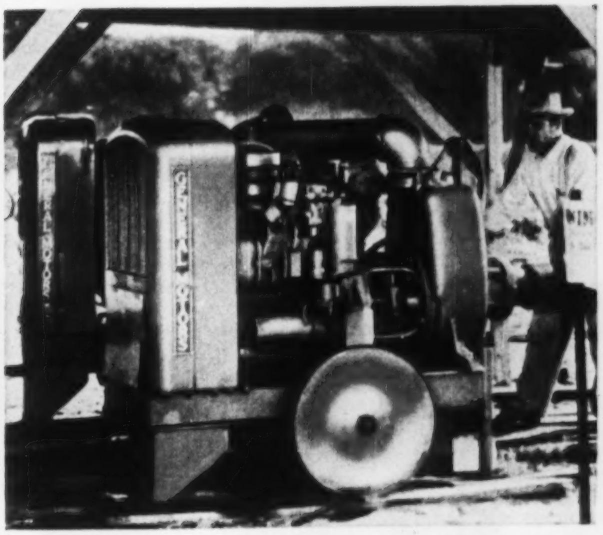
Iowa's Gene McClain Construction Company has GM Detroit Diesel power in this Cedarapids asphalt plant and in a shovel. Superintendent Jim Grundy says, "We've standardized on GM Diesel power for this operation because GM Diesels are economical to run. Dealer service is quick and good . . . the company stands behind their product."

GM
GENERAL MOTORS
MORE
POWER
FOR YOU



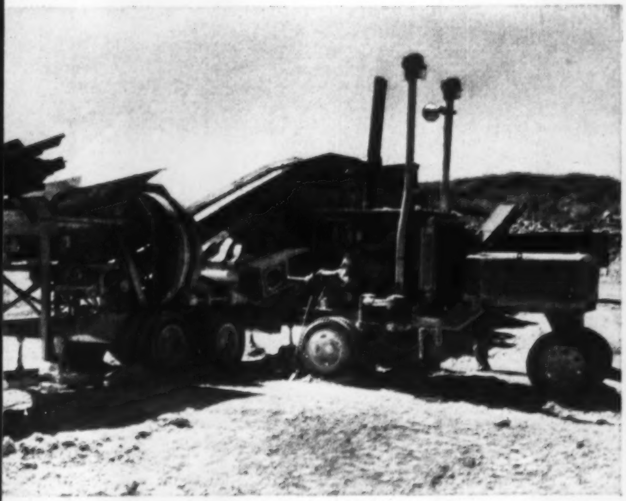
MOVES 1000 YARDS IN 10 HOURS

And that's big production for a ¾-yard dragline. This GM Detroit Diesel-powered Unit has been working for Michigan contractors, Henry Schmid Sons, since 1946. Its GM Detroit 2-cycle Diesel burns about 12 gallons of 14.9¢ Diesel fuel a day—cost only $100 for repairs in more than 17,000 hours of operation.



MULTIMILLION-DOLLAR DEPENDABILITY

Faced with wet footings on this multimillion-dollar sewage plant contract, Pittsburgh's Rust Engineering Company put GM Detroit Diesel-powered Jaeger dewatering pumps to work. Superintendent P. J. Pedone says, "The GM Detroit Diesel engines have proved very satisfactory . . . they're keeping footings dry so we can go ahead with the job."



3 GM UNITS ALMOST DOUBLE OUTPUT

Kansas' Reno Construction Company reports their new Cedarapids portable rock crusher with three new GM Detroit Diesels stepped up output from 200 tons per hr. to almost 400 tons. One "6-110" Diesel powers the primary 36″ x 45″ double impeller impact breaker, a GM Detroit Twin "6-71" powers the secondary and a "3-71" powers the conveyors, screen and feeders.

25% MORE WORK FROM GM DIESEL POWER

One of the best known excavating companies in Northern New Jersey and New York State is Raymond L. Cole Construction Co. "Our GM Detroit Diesel-powered American shovels do at least 25% more work than other Diesels in the same number of hours. They are more flexible," reports this user of one 1½- and three ¾-yard shovels . . . all GM Detroit Diesel powered.

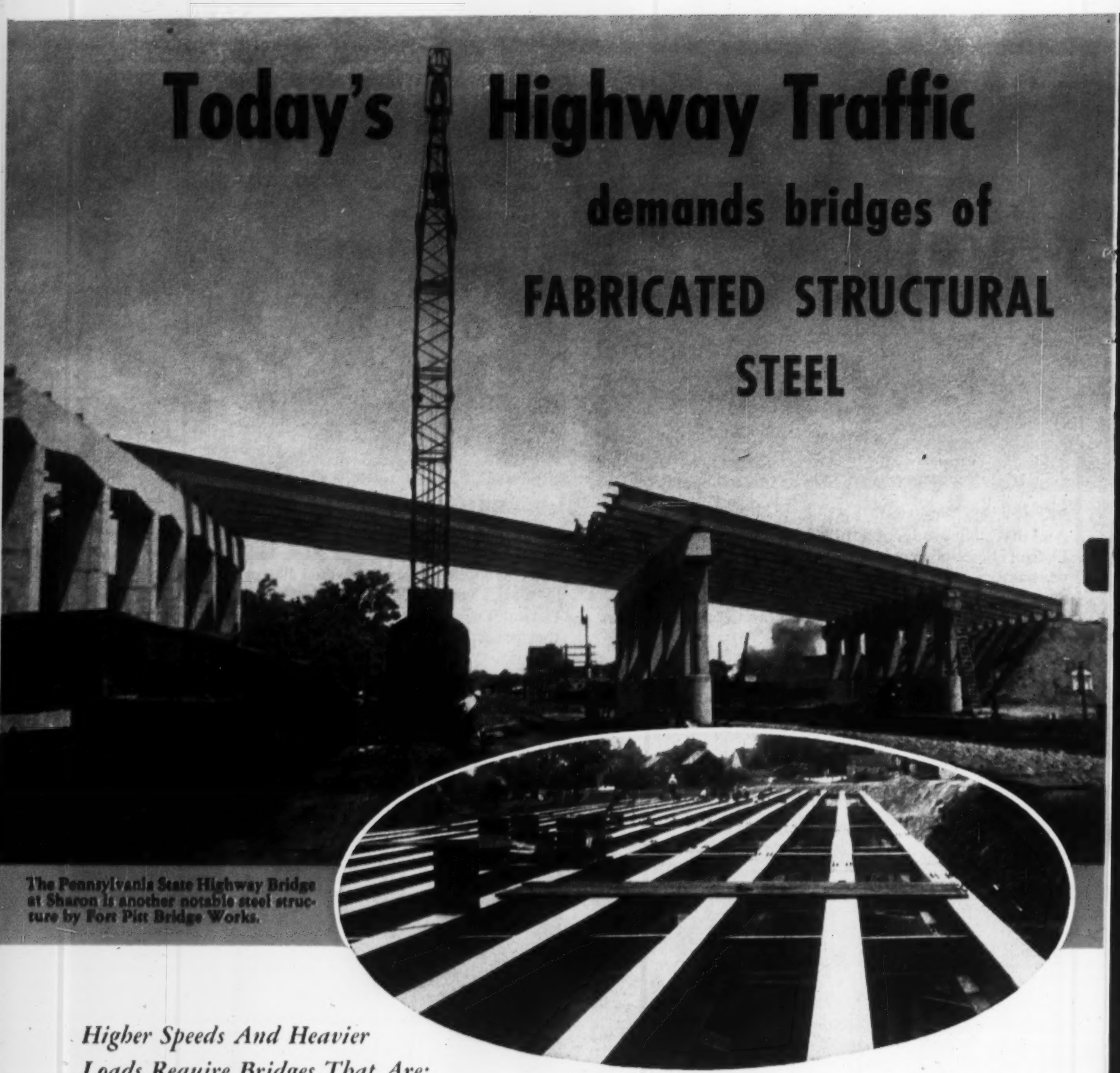
DETROIT DIESEL

Engine Division of General Motors · Detroit 28, Michigan

Single Engines . . .
30 to 300 H.P.
Multiple Units . . .
Up to 893 H.P.

AMERICA'S LARGEST BUILDER OF DIESEL ENGINES

Today's Highway Traffic demands bridges of FABRICATED STRUCTURAL STEEL



The Pennsylvania State Highway Bridge at Sharon is another notable steel structure by Fort Pitt Bridge Works.

Higher Speeds And Heavier Loads Require Bridges That Are:

- Stronger
- Permanently Safe
- Able to Withstand Greater Abuse

Steel structures by Fort Pitt Bridge provide those key advantages, plus economy and fast erection. You'll like the prompt follow through and service of this 60-year old organization of structural steel specialists.

Fort Pitt BRIDGE WORKS

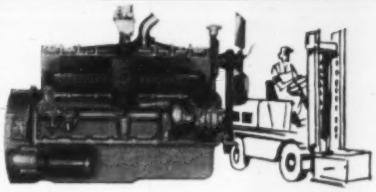
Member American Institute of Steel Construction

General Offices: PITTSBURGH, PA. **Plant at CANONSBURG, PA.**

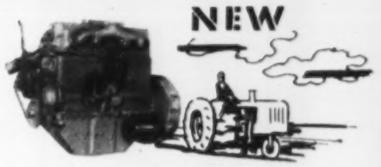
District Offices: New York, N. Y. • Cleveland, Ohio • Detroit, Michigan

Steel Permits Streamlining Construction with Safety, Endurance and Economy

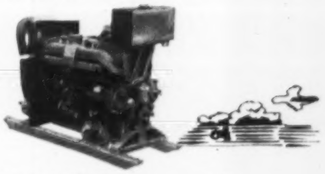
NOW . . . all types of engines from one dependable source



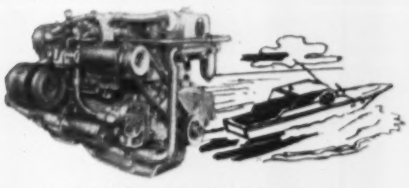
L-HEAD GASOLINE — Compact and especially adaptable for installations where space is limited.



DD-SERIES — Direct injection Diesel. 12 models INTERCHANGEABLE with GO-Series gasoline engines.



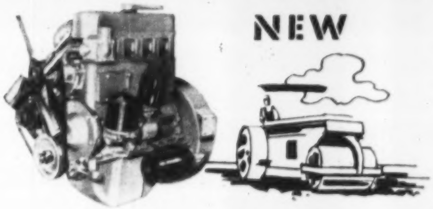
L.P.G. NATURAL GAS or KEROSENE engines are available in 40 models also popular sizes for irrigation service.



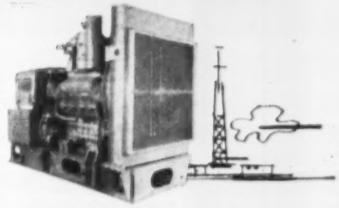
MARINE DIESEL ENGINES — Sizes from 75 to 500 H.P. for workboats and pleasure craft.

PRODUCTS OF

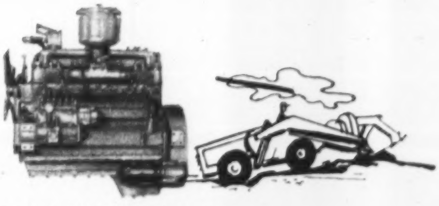
HERCULES engine manufacturing specialists



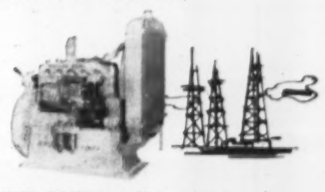
GO-SERIES — Gasoline Overhead valve engines. Available in 12 models.



SUPERCHARGED DIESELS — Maximum power for special installations such as micro-wave generator sets for coast-to-coast T.V.



TURBULENCE CHAMBER DIESELS — 32 models to 500 H.P. in 1, 2, 4, 6 and 8 cylinders.



POWER UNITS — Open, closed or base type units are available in most models of gasoline and diesel engines.

NOW . . . with the addition of the G O series (Gasoline Overhead valve) and the D D series (Direct injection Diesels), Hercules Motors Corporation offers a most extensive line of piston type engine to meet the varied needs of modern industry.

In addition to the many types of engines illustrated above, it is the policy of Hercules Motors Corporation to tailor engines to the special requirements of their manufacturing customers. Special versions of regular models — for example, "pancake" or flat engines — are often produced for particular applications.

Whatever your power requirements may be, HERCULES — Engine Manufacturing Specialists Since 1915 — will be happy to work with you and solve your power problems. For more information on the new G O and D D series — or any type of Hercules Engine from 3 to 500 H.P. contact the factory.

HERCULES MOTORS CORPORATION

CANTON 2, OHIO

OLIVER OC-12 ***delivers a basement every 5¼ hours!***

Full bucket loading is easier with the Oliver OC-12. Wide control range provides a big advantage in bucket rollback, digging depth and dumping height. Long track frame insures exceptional stability.

That's the production record of Harry H. Meyer Co. on this housing project near St. Louis. Digging basements 40′ x 26′ x 6′ deep, the Oliver OC-12, equipped with 1¼-yd. loader, averaged 1½ of these excavations per day—only 5¼ hours each! That's low-cost dirt moving in anybody's language—and especially for exacting work of this kind.

No wonder the OC-12 is stepping into the picture and stepping out with bigger profits for its owners. Powerful, with 53 drawbar h.p. (either diesel or gasoline), this fast worker has the smooth, responsive control that lets you work more efficiently in close quarters. With heavier construction and many fine new features, the OC-12 is ready to handle your toughest assignments with greater speed and lower costs. Your Oliver dealer has the facts. See him today!

THE OLIVER CORPORATION
400 West Madison Street, Chicago 6, Illinois

OLIVER

a complete line of industrial wheel and crawler tractors and matched allied equipment

THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

ROEBLING

Royal Blue

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

Ask us for the full facts about Royal Blue Wire Rope, or contact your Roebling distributor.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST. AVE. S. • TULSA, 321 N. CHEYENNE ST.• EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Why Cement Gels Concern You . . .

What is a Cement Gel?

A cement gel is a jelly-like swelling that occurs around each grain of portland cement when water is added to the concrete mix. It is the initial reaction product between cement and water. The gel is the controlling factor in cracking, uniformity and structural quality of concrete.

The cement gel imparts fatty and cohesive properties to the mix. As hydration of the cement proceeds, the gel partly crystallizes and, on drying, reverts to almost the original cement grain size.

Gel size and hydration vary widely, depending upon water and temperature. It is this difference that causes variations in the quality of concrete for a given mix design.

In the heat of summer gels form faster and larger. Large gels absorb more water from the mix. Thus, more mixing water is required for adequate workability. The resulting concrete has poorer quality. As water is consumed by hydration and lost through evaporation, internal stresses are created. These eventually result in shrinkage cracks.

In cooler weather gel formation is retarded. Smaller gels are formed, and less mixing water is needed. Concrete quality is proportionately better. Less shrinkage occurs, the concrete is more dense and has higher structural quality.

Thus, the gel is the governing factor in controlling the uniformity, structural quality and cracking of your concrete.

Cement Gels Can Be Controlled

The size and action of the cement gel can be controlled chemically with a gel-reducing agent developed exclusively for this purpose, Plastiment Concrete Densifier.

Plastiment reduces gel size and retards hydration in direct proportion to the quantity added. This effect is uniform and predictable with all types of concrete. Changes in mix design, aggregate graduation, use of air entraining or other additives do not affect its action. Results of this controlled gel size are: higher density, higher compressive strength, higher bond to steel and reduced cracking.

With this constant predictable effect, it is logical to keep the gel formation and setting time uniform by increasing the quantity of Plastiment as temperature rises. In this way, Plastiment offsets the damaging effects of high temperatures.

CEMENT GEL 90°F. — CEMENT GEL 50°F. — PLASTIMENT-CONTROLLED CEMENT GEL

Smaller chemically-controlled gels result in an exclusive rapid clear water bleeding action, without scum and laitance being carried to the surface. This acts as a safety factor should concrete receive an over-dose of water at the job-site.

Plastiment is thoroughly dependable and performs exactly as stated. For this reason, Plastiment has been the logical choice of top structural designers for most of the floating concrete structures and large prestressed structures in the world today, as well as a great variety of other structures where uniformity and high quality of the concrete is essential.

Plastiment offers each engineer a dependable tool for controlling setting time, uniformity and cracking in concrete.

Let Plastiment Work for You

Our engineers will be glad to tell you how Plastiment can help you on your current job. For more detailed information on Plastiment's action on the cement gel, write today for a copy of the illustrated booklet "Plastiment Concrete Densifier."

Sika

PLASTIMENT CONCRETE DENSIFIER

SIKA Chemical Corporation, Passaic, New Jersey

DISTRICT OFFICES: BOSTON • CHICAGO • DALLAS • PHILADELPHIA • PITTSBURGH • SALT LAKE CITY
WASHINGTON, D. C. • MONTREAL, CANADA • PANAMA CITY, PANAMA • DEALERS IN PRINCIPAL CITIES

IRVING GRATINGS UNEXCELLED From Every Angle!

Engineering-Wise:

1. Irving *specializes* in the manufacture of *all types* of gratings. Irving engineers are prepared to handle any grating problem, no matter how complicated (such as proper fit, unusual conditions of stress, corrosion, etc.).
2. Complete pre-order service by Irving estimating staff includes prompt, accurate recommendations and quotations. All orders are checked by engineers with years of specialized experience.
3. Comprehensive drafting organization assures precision manufacture plus uninterrupted flow of production; accurate erection drawings supplied with every order.
4. Prior to shipment gratings are carefully inspected for conformity to specifications and to Irving high standards of quality.

Economy-Wise:

- Precisely fabricated panels make installation easier, faster.
- Costly mistakes are avoided by utilizing up-to-date engineering skill and valuable experience unique with Irving.
- Irving quality gratings require minimum maintenance.
- Irving reputation of over 50 years of customer satisfaction is your guarantee of effective grating application.

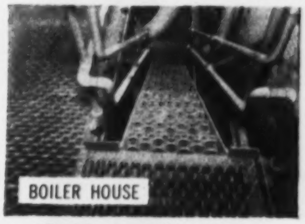
Performance-Wise:

OIL REFINERY

Non-skid; fireproof

BUS LAUNDRY

Strong; self-draining


BOILER HOUSE

Self-ventilating; durable

SEWAGE PLANT

Irving ALUMINUM Gratings- rustproof, sparkproof, lightweight

PIONEERS of the OPEN METAL FLOORING INDUSTRY

ESTABLISHED 1902

IRVING SUBWAY GRATING CO., INC.

Plants:
5063 27th St., Long Island City 1, N. Y.
1863 10th St., Oakland 20, California

Write today for our illustrated catalog containing engineering data on Irving Riveted, Welded and Presslocked gratings that will save you time and money!

MONOTUBE STEEL PILES

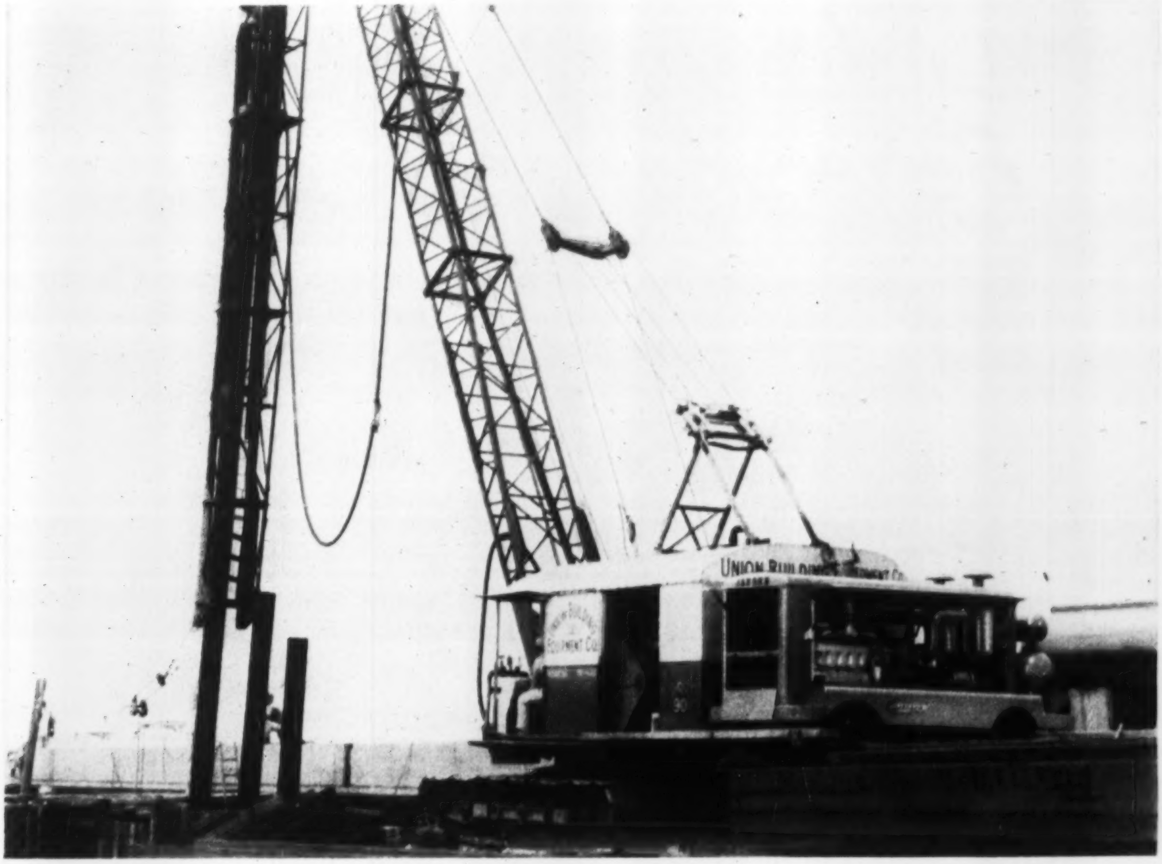
. . . easily extended right on the job

All it takes is a fast, simple weld to extend Monotube steel piles to any required length. Either standard sections, or for added economy, cut-offs from previously driven piles can be used. And while one pile is being extended, driving continues on an adjacent pile. There's *no* lost time!

Here's another important point to remember . . . Monotubes combine light weight and ease of handling with cold-rolled strength for *faster* driving . . . and at lower cost! On most jobs, driving can be handled quickly, easily by light, mobile rigs. Find out for yourself how Monotube piles save time and money on *all* types of foundation work. Write today to The Union Metal Manufacturing Company, Canton 5, Ohio, for your copy of Catalog No. 81.

1906 *Fiftieth Anniversary* 1956

UNION METAL



COMPLETE PILE DRIVING UNIT ON CRAWLERS: To obtain a minimum safe bearing of 75 tons, 12 WF 74 piles were driven to average 170′ depth by splicing 65′ lengths. The compact driving rig was devised because of the limited area adjacent to heavy traffic. Union Building & Construction Corp., Passaic, N. J., contractor.

Jaeger Rotary fits tight spot on Turnpike

Widening the New Jersey Turnpike between Secaucus and Ridgefield involved driving piles to 170′ depth in a very limited working area adjacent to heavy turnpike traffic. The job was done "with excellent results" by mounting a Jaeger 600 "Roto" compressor on the crane, the Jaeger rotary being compact for mounting *and easily able to maintain constant full pressure in the Vulcan No. 1 hammer by direct feed.*

Contractors who use Jaeger Rotaries for pile driving frequently describe their operation as "*smooth as steam*". This is because Jaeger engineers have devised faster-acting, closer-regulating controls to hold pressure constant under fluctuating demands. All speed modulation is smooth and stepless. There is never any over-run or racing of the engine. Your Jaeger "Roto" also operates at slower speeds than other rotaries, using less fuel and undergoing less wear. For complete data, call your Jaeger distributor or send for Catalog JCR5.

Jaeger Roto Air-Plus® "600".
125 and 365 cfm units also available.

THE JAEGER MACHINE COMPANY

200 Dublin Avenue, Columbus 16, Ohio

PUMPS • MIXERS • TRUCK MIXERS • SPREADERS • FINISHERS • LOADERS

BRIXMENT

Better Mortar for Blocks

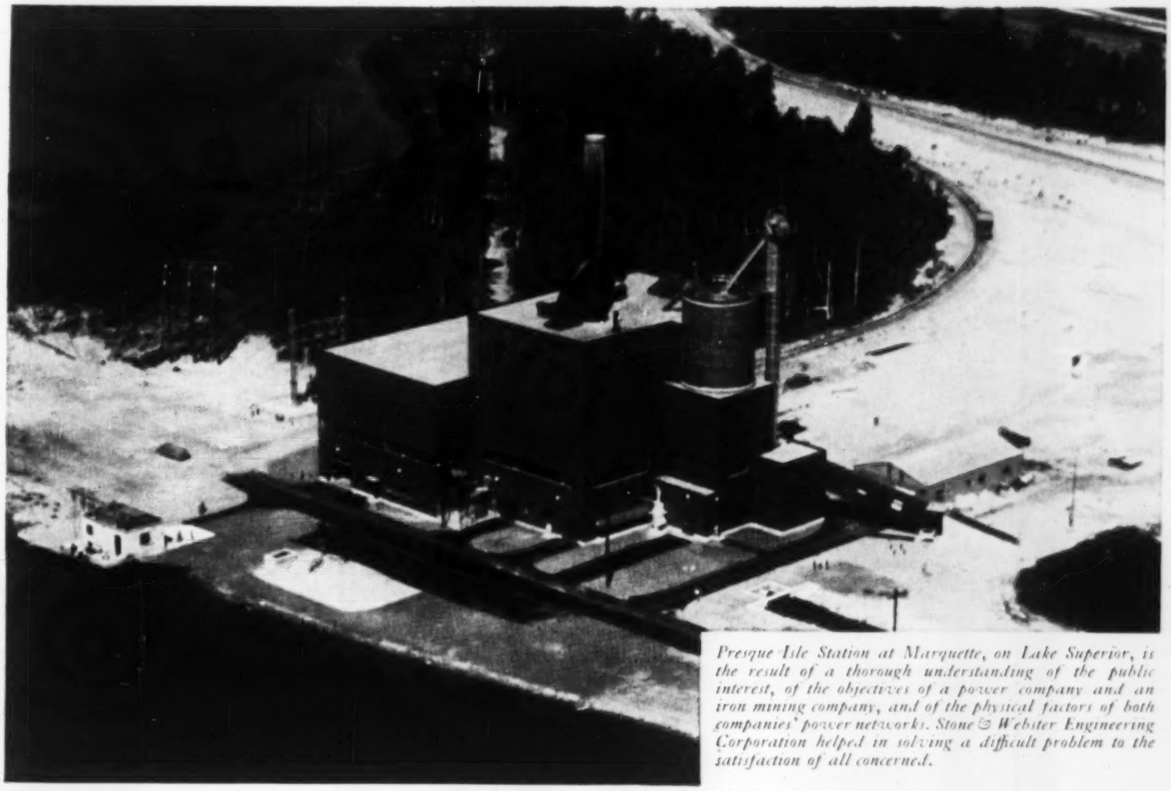
BETTER PLASTICITY

To build the best possible concrete-block walls, the bricklayer must use plastic mortar. The mortar must be plastic enough to stick to the long head joint. It must not drop off the edges of the block when the block is swung up, and lowered into place. It must remain plastic long enough to enable the bricklayer to tap the block down to the line, easily and accurately.

Brixment mortar provides this necessary plasticity. Moreover, it stays soft and plastic long enough to let the bricklayer level, plumb and straighten the unit and adjust it to its final position in the wall before the mortar stiffens.

Louisville Cement Company . . . Louisville 2, Kentucky

BRIXMENT
WATERPROOFED CEMENT FOR MASONRY
BRIXMENT
BRIXMENT



Presque Isle Station at Marquette, on Lake Superior, is the result of a thorough understanding of the public interest, of the objectives of a power company and an iron mining company, and of the physical factors of both companies' power networks. Stone & Webster Engineering Corporation helped in solving a difficult problem to the satisfaction of all concerned.

SOLVING THE POWER PROBLEMS ON MICHIGAN'S UPPER PENINSULA

To meet the critical demand for more power in Michigan's Upper Peninsula region, the Upper Peninsula Power Company and The Cleveland-Cliffs Iron Company retained Stone & Webster Engineering Corporation to assist in their separate expansion programs.

As a result of intensive studies and investigations of all aspects of the situation by the Engineering Corporation, it was decided to build a single jointly-owned steam power plant. Presque Isle Station was designed and built by the Engineering Corporation and is now on the line with initial installation of 22,000 kilowatts.

If you have a problem of design or construction, our broad experience in these and related fields may help you solve it. Write or call us for complete information on our services.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY *of* STONE & WEBSTER, INC.

New York Boston Chicago San Francisco Los Angeles Houston Pittsburgh Seattle Toronto

General Electric Engineering Building, Cleveland, Ohio. Architects: Blaw Knox, Pittsburgh, Pa. Contractor: George A. Rutherford Co., Cleveland, Ohio. Type H Curtain Wall with spandrel panel. Exterior is embossed aluminum sheet. Insulation 1 inch thick Fiberglas covered on inside with aluminum sheet. Ventilators are project-out type. Two story building. Curtain-Wall on one elevation.

Cut Construction Time with Lupton Curtain-Walls

Construction schedules can be shortened by weeks, or even months, with Lupton Curtain-Walls. Window and wall units are prefabricated from the plans, and installed as the building framework is completed. There's no on-the-site delay and no waiting on the weather. Installation is done from within the building.

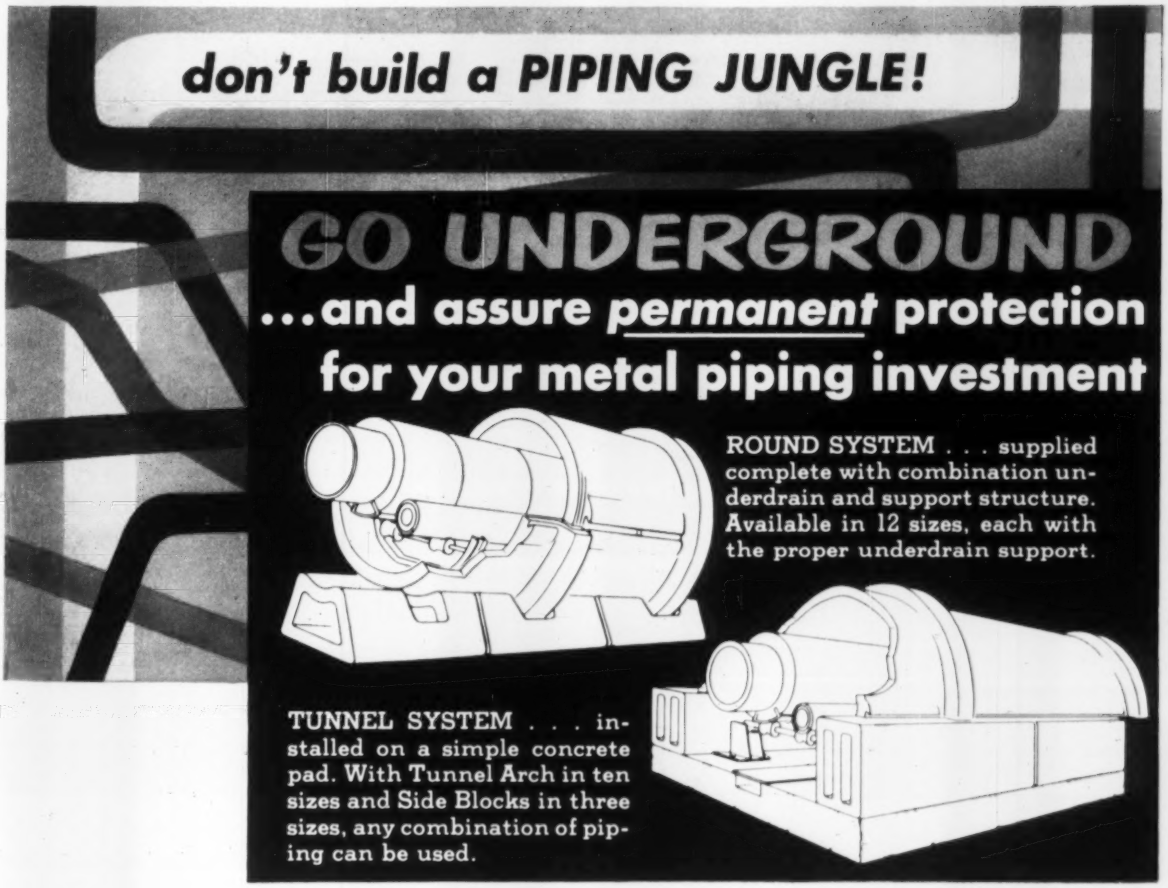
Here's another big advantage with Lupton Curtain-Walls . . . fabrication and installation are done under one contract. You are relieved of all construction and installation details.

Lupton Curtain-Walls are "your" walls. You choose the window style. You choose the panel material from aluminum, stainless steel, glass, or porcelain enamel. The wall panels can be as severe or as colorful as you want, and the beauty is permanent. Aluminum frames, aluminum windows and lifetime panels *keep* Lupton Curtain-Walls "new".

Plan with the new Lupton Simplified Curtain-Wall System. Send for brochure detailing and illustrating this modern way to build.

MICHAEL FLYNN MANUFACTURING COMPANY
Main Office and Plant: 700 East Godfrey Avenue, Philadelphia 24, Pa.
New York Office: 51 East 42nd Street, New York 17, N. Y.
West Coast Office: 672 South Lafayette Park Place, Los Angeles 57, Calif.
Stockton Office and Warehouse: 1441 Fremont Street, Stockton, Calif.
Sales Offices and Representatives in Other Principal Cities

LUPTON **METAL WINDOWS AND CURTAIN-WALLS**


don't build a PIPING JUNGLE!
GO UNDERGROUND
...and assure *permanent* protection for your metal piping investment

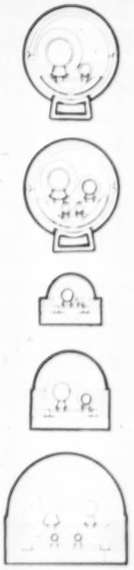
ROUND SYSTEM . . . supplied complete with combination underdrain and support structure. Available in 12 sizes, each with the proper underdrain support.

TUNNEL SYSTEM . . . installed on a simple concrete pad. With Tunnel Arch in ten sizes and Side Blocks in three sizes, any combination of piping can be used.

STILLWATER CONDUIT SYSTEMS

There's one material that never wears out underground. That's vitrified clay. And vitrified clay is the major component of Stillwater Conduit Systems—both Tunnel and Round types. When you run your service piping underground, through Stillwater Conduit, you not only eliminate unsightly jungles of overhead pipe . . . you protect that piping permanently . . . and you lay it straight and true, with fewer "runarounds" to avoid obstacles, and fewer fittings that cause turbulence and pressure drop.

Stillwater Conduit Systems are completely unaffected by extremes of temperature or moisture, or the attack of corrosive soils and ground waters. They provide the *best possible* protection for the enclosed metal service piping. We'll give you all the engineering help you need to design the complete system—and we'll follow through by supervising the actual construction job. Large warehouse stocks assure prompt shipment of any size order, complete with all accessories.



Any combination of service piping can be accommodated by Stillwater Conduit Systems, using either filler or sectional insulation.

WRITE FOR *new four-page, file-size bulletin, with full details*

The Stillwater Clay Products Co.
STILLWATER CONDUIT DIVISION
3334A PROSPECT AVENUE, CLEVELAND 15, O.

STILLWATER
CONDUIT
SYSTEMS

SW-156-62

THE LINE THAT HELD

At Waterbury, Conn., this Lock Joint Reinforced Concrete Cylinder Pipeline, undermined by flood waters, gave trouble-free service, alleviating a critical water shortage.

Although sections of this 48" Lock Joint water supply line for Hartford, Conn. were uncovered by the flood, it continued to give satisfactory service.

The destiny of England once hung on Wellington's "thin, red line" at the Battle of Waterloo. Daily your community's safety from fire and epidemic depends, to a large degree, on its water supply and sewage lines.

When the backwash of Hurricane Diane inundated western New England, the many Lock Joint installations in the area stood firm. These lines, in some cases the main source of water supply or of sanitary sewage disposal, continued to give trouble-free service even when uncovered and undercut by raging flood waters.

Such rugged pipe deserves your consideration. Its strength is evident, its initial high carrying capacity is permanent, and its useful life is exceptionally long.

LOCK JOINT PIPE CO.

East Orange, New Jersey

Sales Offices: Chicago, Ill. • Columbia, S. C. • Denver, Col. • Detroit, Mich. • Hartford, Conn. • Kansas City, Mo.

Pressure • Water • Sewer • REINFORCED CONCRETE PIPE • Culvert • Subaqueous

ENGINEERING NEWS-RECORD
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THE CONSTRUCTION WEEK

AIRPORT PLANS—The big unknown in that major airport expansion boost that's being pushed by the federal government (page 41) is the jet plane— and what it will and won't do.

It's significant that of all the hundreds of plans now frying on the planners' front burners only one has any direct connection with the specific problems that will be posed by the jets within a few years.

The reasons—from the viewpoint of the civil engineer—are simple enough: Nobody is prepared to say what the jet engine manufacturers can come up with in the way of using the engine itself (as piston engines are now used) to cut short the necessary landing run, and to boost the takeoff climb rate and thus cut the new needed takeoff run.

Obviously such improvements could make all present calculations as to length of runways obsolete together with the problems of acquiring additional land for runways and clearing areas beyond the runways of possible obstructions.

DOUGH FOR THE BIG DAM—Aswan High Dam, described in last week's issue, moved a step nearer starting with the announcement this week of substantial agreement on a $200-million loan between Egypt and the International Bank for Reconstruction and Development. This loan has been the key to getting Egypt started on the project on which it bases its entire future economy. Its negotiation further will mean the West, and not Russia, will be Egypt's aid in the mammoth undertaking. The U.S. and Britain have already promised grants totaling $70 million for first stage work. Egypt's own economy is to carry the real load—$900 million of the project's $1.3-billion total.

THOUGHT PROVOKER—An intriguing explanation for the rigid-frame failures in Air Force warehouses that have aroused lively controversy among concrete engineers (ENR Jan. 12, p. 21) will be presented at a code committee hearing at the American Concrete Institute's annual convention in Philadelphia next week.

Jacob J. Creskoff, president of the Thermo-Fluid Corp. of Philadelphia, will contend that where reinforcing steel in a horizontal beam changes direction, the tensile force in the steel has a vertical component, which sets up tensile stresses in the concrete. These stresses, he claims, are the correct order of magnitude and direction to account for the failures.

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WASHINGTON OBSERVER

Corps of Engineers came out strongly against the bid-shopping bill during hearings last week before a subcommittee of the House Judiciary Committee.

General Tulley, Chief of Military Construction, stated repeatedly in answers to questions put to him from several angles: The bill if it became law would cost the government more money.

In charge of spending upwards of $1.5-billion per year, it is obvious that the General's testimony carried a lot of weight. **Chances are that the bill will still be approved by Congress.** But Tulley's testimony increases the likelihood of a Presidential veto. In such an event, you can be sure Congress wouldn't over-ride the veto.

•

Franklin G. Floete, new chief of General Services Administration, was a natural to succeed Edmund Mansure, who resigned following Congressional criticism of the placement of insurance contracts.

Floete was responsible for billions of dollars of construction during his two and a half years as Assistant Secretary of Defense for properties and installations. His job also included maintenance and management of all military real property.

•

There's a lot of politics in the location of federal airport funds. It's one of the programs that spreads benefits around the country (see page 41).

The Democrats are charging that the Republicans tipped off the Republican National Committee and local beneficiaries before the locations were given to anyone else—including the congressmen.

Actually, this kind of politics is played by the party in power—as the Democrats well know from their own long years in office.

•

Construction of civilian atomic reactors will be expanded. The Atomic Energy Commission this week approved the $26-million, 134,000 kw project of the Yankee Atomic Electric Co., to be built in western Massachusetts. It was the fourth so-called large demonstration reactor project to be approved so far.

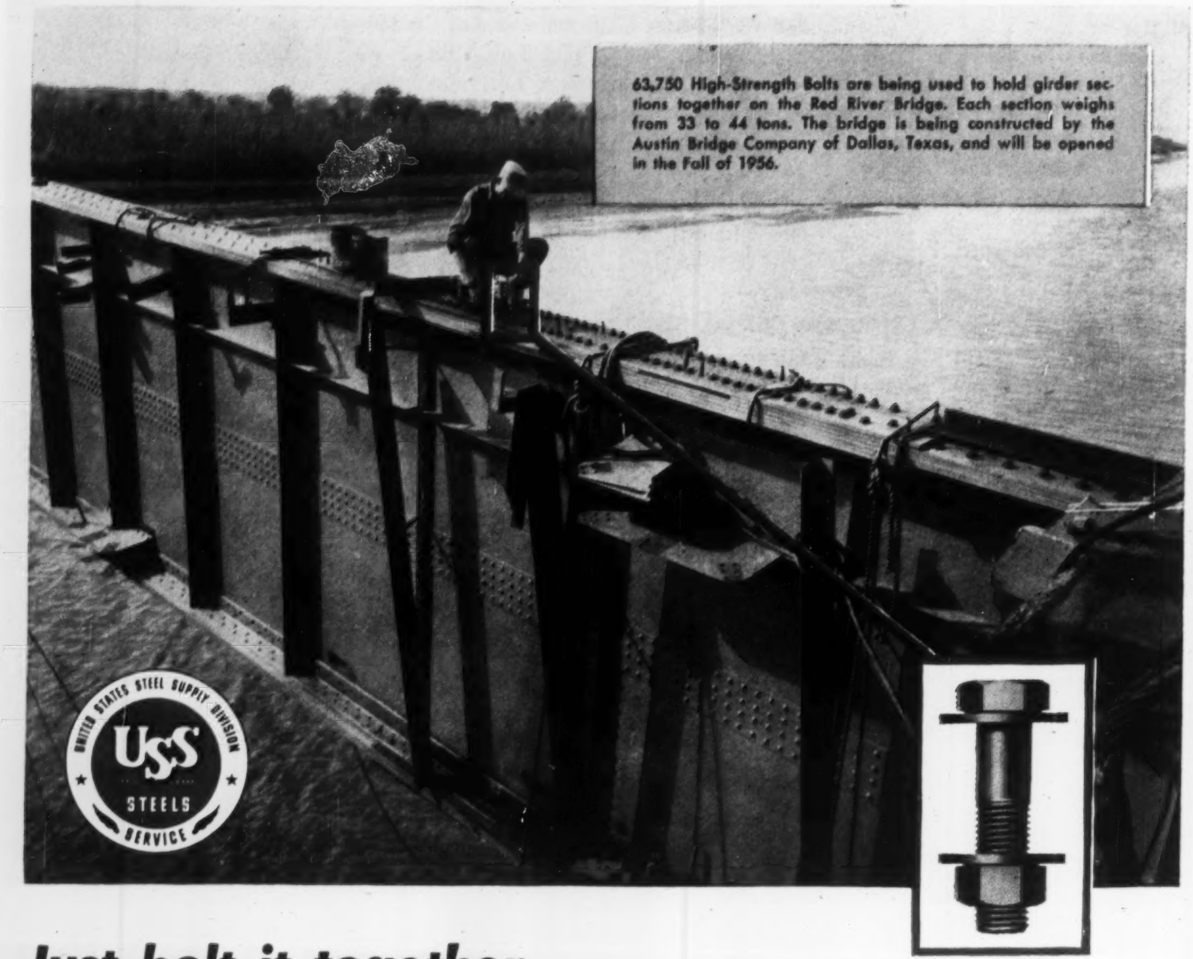
Other reactors, now being engineered, will be built by Consumer Public Power District of Nebraska, Power Reactor Development Co. (Detroit Edison and others), and Nuclear Power Group (Commonwealth Edison and others).

AEC is now considering applications for seven smaller reactors. They will be up to 40,000 kw capacity. Applicants are the cities of Holyoke, Mass., Orlando, Fla., Piqua, Ohio; three cooperatives at Hersey, Mich., Elk River, Minn., and Anchorage, Alaska, and the University of Florida.

Issue of atomic hazard insurance policy is coming to a head. A study committee for the AEC estimates the insurance companies can underwrite $60 million in public liability and $50 million for plant damage, for each atomic facility. These figures are now being studied, but they represent the conclusion that an atomic industry can be insured.

General Electric Co. is going to build a guided missile plant near Philadelphia. Once the facility is built, the company's guided missile headquarters will be moved to the Philadelphia plant from its present installation in Schenectady.

GE's new jet engine test center will be built at Evendale, Ohio. Construction will begin in the spring; the plant will cost $20 million.



63,750 High-Strength Bolts are being used to hold girder sections together on the Red River Bridge. Each section weighs from 33 to 44 tons. The bridge is being constructed by the Austin Bridge Company of Dallas, Texas, and will be opened in the Fall of 1956.

Just bolt it together . . .

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Jets or no jets . . .

Airport Construction Is on the Rise

Although almost lost in the bright glare of debate over highway, school and other programs, there is a really substantial airport construction and improvement program right now.

It's a program that's expected to achieve a magnitude of more than $500 million (in federal aid and matching funds), starting immediately and stretching over a period of four years, entirely on civil aviation facilities.

Just how fast the program is getting under way is evidenced in the annoucement late last week by the Civil Aeronautics Administration of allocations totaling $39 million for improvement of 319 airports during the remainder of the fiscal year 1956—which ends June 30, 1955. A partial list of some of the major allocations is given in an accompanying table.

There's been considerable delay in getting the spending program off the ground—a delay caused in part by the need to revise plans to account for added federal money and in part by still-unresolved engineering questions having to do with the requirements for jet-powered commercial aircraft.

But, it is apparent that part of the delays are past, and money will be spent—and construction gotten under way—fast. It will be spent first on enlarging and improving passenger and operating facilities now desperately antiquated or overcrowded at most major air terminals. Really heavy spending on runways, paving and the like is going to be a much slower process.

• What's available—Real spark for the airport work was set off in the Monroney Bill, approved by Congress in midsummer of 1955 (ENR Aug. 18, 1955, p. 21) which:

- Upped the Administration's modest $22-million budget request for civil airport aid for fiscal 1956 to $62.5 million.
- Provided a total of $252 million of federal matching grants to stretch through fiscal year 1958. The federal funds become available on this schedule: $63 million before June 30 of 1956, and $63 million for each of the three following fiscal years.
- Gave the Civil Aeronautics Administration much greater latitude in placing grants where they will do the most good. For example, the old law restricted funds to airports that had at least 30 planes base on the field permanently, or handled 3,000 passengers annually; the new law permits allocations of funds on the basis of aeronautical necessity, or anticipated need.

Basically, the law assures funds for airports in the same manner that federal-aid highway laws assure funds for roads. Seventy-five percent of the federal money is to be parceled out to the states in proportion to area and population, and then distributed within the state. The remaining 25% of federal funds are reserved for allocation at the discretion of the Department of Commerce and CAA to airport projects that will yield the greatest national benefit.

• Helps a lot—Initially, passage of the Monroney Bill held up appropriations, because the unexpected windfall of money, plus the changed rules, made it necessary for sponsors and CAA to overhaul the programs they had prepared in anticipation of much smaller funds.

However, much of that delay has been cleared away, and by late summer of 1955, allocations for projects totaling $40 million at 205 airports had been approved.

In general, the total of $500 million now in sight for airport improvement should go a long way toward meeting current needs. A compilation by three groups of airport operators last year listed requirements of $470 million—about 90% of which would go for construction, the rest for land acquisition. And nearly five years ago (ENR July 12, 1951, p. 23) CAA itself estimated that $622 million should be spent to improve or construct airports at 4,945 locations.

Evidence of how fast local agencies are preparing to take advantage of the money granted can be gained from random sample of reports received by ENR.

New York's Port Authority (under some pressure from city officials) is planning to start spending some $60 million this year on improvements to passenger facilities at Idlewild Airport; San Francisco's Public Utilities Commission is given first priority to getting a $6.5-million bond issue for airport improvements on the November ballot; Portland, Ore., is planning to start a $10-million airport expansion program by July of this year. Los Angeles may put up a $59-million bond issue in June to foster major improvements to its airport.

Chicago is rushing an $18.7-million improvement program on its sprawling O'Hare Field; Kansas City has its $26-million Mid-Continent International Airport under way; New Orleans expects to finish an $8-million terminal this year; Louisville, Ky., with a $6-million program is improving Standiford Field; means of raising capacity at the Washington, D. C. National Airport are under study.

• But what about jets?—But, it is significant that none of these plans, and only one now being discussed, contains any provision for added con-

ASCE Members OK Ethics Code Change

Tellers tallied the vote last week and found members of the American Society of Civil Engineers in favor of a change in their code of ethics. Of those who voted, 12,443 favored the change, 1,554 were against.

The amendment would change Clause 4 of the code to permit engineers competing for professional engagement to state their price when there are reasonable grounds for belief that price will not be the prime consideration in choice among competing engineers.

The report of the tellers will be made to the Board of Direction of ASCE at its Dallas convention next week.

The total vote on this amendment represents just over a third of the Society's 38,000-plus membership. But there were only about 2,500 more total replies two years ago when a constitutional amendment was passed to raise the dues.

. . . Airport construction is rising

Major 1956 Projects

Some of the major civil airport construction programs, and the amounts of federal-aid matching funds included in the CAA's $39-million allocation of funds for the remainder of fiscal year 1956, are:

New York International (Idlewild)	**$1,300,000**
Chicago (O'Hare)	**732,000**
Los Angeles International	**628,687**
Seattle-Tacoma	**692,675**
Denver (Stapleton)	**675,422**
Boston (Logan International)	**865,000**
Honolulu International	**797,500**
Phoenix	**657,459**
Oakland	**1,300,000**
Peoria	**693,000**
Indianapolis, Ind.	**608,492**
Covington, Ky.	**622,143**
New Orleans	**1,265,923**
Detroit (Wayne County)	**975,614**
Kansas City (Municipal)	**800,000**
Newark, N. J.	**777,500**
LaGuardia (New York)	**975,000**
Cleveland (Hopkins)	**971,500**
Columbus, Ohio	**1,000,000**
Portland, Ore.	**1,300,000**
Philadelphia	**762,500**
Salt Lake City	**532,094**

struction to handle the jet aircraft that are expected to hit the civil runways about 1959.

One reason for this animponderable—now largely in the minds of engine designers—whether some reversing action can be built into a jet engine that can be used to slow the plane's ground speed in the manner of the reversible propeller attachments now used on piston-driven planes.

Another reason—closely tied to the question of jet engine development—is the rate of climb possible on a safely operated jet transport. This rate is in fact quite low—the jets must take off on a long-flat trajectory, which in turn seems to require longer runways, and certainly larger cleared areas at the ends of the runways. And the price of land around most of the 535 major certificated airports in the U. S. is already prohibitive.

• **Runway requirements**—According to an authority such as C. J. Lowen, Administrator of Civil Aeronautics, a maximum length of runway for a long-range jet airline might be 9,000 to 9,500 ft for takeoff at sea level and at 59 deg standard temperature.

Applying that figure to existing major airports, and correcting their runway lengths to account for the standard conditions cited by Mr. Lowen, it appears that only one major airport now in existence can qualify —Honolulu's International Airport with its 13,104 ft runway.

On other major ports, the 9,422 ft length of Idlewild's longest runway comes down to 8,724 ft; O'Hare Field's 8,000 ft runway reduces to 6,838; Boston's Logan Airport has a 10,012 ft runway that corrects to 9,185.

These lengths, it is pointed out, may be sufficient for shorter-range jet craft.

Weights of the jet aircraft also may be a factor in runway and taxiway design, since manufacturers are talking about 300,000 lb and greater wheel loads. However, use of dual-tandem landing gear may reduce wheel loads and make most existing pavements usable.

The one development specifically aimed for jets is at Long Beach, Calif., where voters approved a $5.5-million bond issue, in part to extend one runway to 10,000 ft for jet transports.

• **Improvements may change it**—But if the engine designers succeed in a project now under serious consideration—developing a jet that can either be totally reversed, or can be made to produce a reverse thrust—then some of the considerations for long runways can be knocked into a cocked hat.

At the moment, there doesn't seem to be an answer to the long, slow rate of climb, which would still require a long runway for takeoff. Jet-assisted systems—successfully used on military planes, are not considered applicable for commercial ships—they're too noisy, and the jet-assisted rate of climb may be too much for the average passenger.

But reports from aircraft manufacturers make it clear that this problem, too, is the subject of study and experimentation.

There are other problems of course, concerned with protection of pavements against plast and fuel spillage —a problem already solved by the military, but on which improvements will be made.

Meanwhile, airport planners will spend their money and concentrate their construction on passenger terminals and facilities, and airline facilities, baggage handling and the like.

Incinerator Price Is Slashed

The city of Los Angeles has accepted a 100-ton per 24-hour capacity rubbish incinerator at only two-thirds capacity because the unit would not pass smog tests at full capacity.

Contract price of the unit accordingly has been adjusted downward from $155,524.79 to $70,524.79. The city plans further tests and as a result may adjust the price upward again. The unit is located in the L.A. harbor area.

Acceptance and price adjustment came after long delays and after the contractor—Morse Boulger Destructor Co.—apparently refused to permit pre-acceptance tests at less than design capacity. In full-scale tests late last year, the unit failed to pass two Los Angeles County Air Pollution Control District tests, one for capacity and one for particulate matter. In a series of six tests, the average particulate matter concentration in the exhaust was slightly more than 0.6 grains per cu ft, whereas maximum permissible is 0.4 grains. Based on this excess, the city calculated that the unit could be operated at two-thirds capacity without violating the smog test rules.

Actually, there has been no determination whether or not municipal facilities are legally required to meet Air Pollution Control District regulations. But in the harbor incinerator case, the specific smog regulations were written into the specifications. The specs further provided that if the plant did not meet the full rated capacity requirements, the city would accept the unit at a lesser capacity with price adjusted at a rate of $2,500 per ton per 24 hours.

The recent acceptance only involves the incinerator proper, the plant's building and chimney were completed and accepted in 1953.

Port Authority Recommended To Handle Boston Facilities

For the second time in two years, Massachusetts' state legislature is considering recommendations calling for the establishment of a state port authority that would consolidate key transportation facilities in Greater Boston.

Frankly modeled after the Port of New York Authority, the Massachusetts group would take over the Port of Boston itself, Logan Airport, the Mystic Bridge, the Sumner Tunnel and other facilities, financing itself out of its own revenues. One of its first jobs would be the construction of a second vehicular tunnel from downtown Boston to East Boston.

The proposal was contained in a report to the legislature by a special commission, and was said to have full support of the governor's office.

Tennessee Road Needs Surveyed

If Tennessee is to bring its highway system up to a level that will be adequate for present and future traffic needs, it must spend a total of $3.6 billion over the next 30 years, state officials were told last week.

The figure appeared in a report by the Automotive Safety Foundation, which has just completed a two-year survey of the state's road system, undertaken at the request of a specially-created state highway study commission under chairmanship of W. M. Leech, state highway commissioner. If it had time enough, the state could probably handle the expenditures without any increase in taxation, the report commented. But, if the state is to catch up within a reasonable time, bond financing will be required.

Here's what the survey said Tennessee must do:

- Improve a bit more than half the highway system outside of cities—4,126 mi, at a cost of $505.8 million;
- Improve or replace 1,590 bridges, and build 214 new ones;
- Build 658 mi of new four-lane highways;
- Rebuild 7,950 mi of rural roads;
- Rebuild one-fifth of major city streets not on state highway system.

• How to pay?—Over the next 30 years, the Foundation said, the state should spend $1.8 billion on state highway system roads; $1.2 billion on county roads; and $565 million on city streets.

On a pay-as-you-go basis, the report disclosed, a 10-year program for the state highway system alone would require an increase of 159% in present income. On a credit financing basis, with retirement of the debt in 30 years, a 10-year program would require only an 8% increase in revenues.

Existing deficiencies on the rural roads system and arterial streets in cities could be overcome in 15 years, with revenues now available to local agencies, the report added.

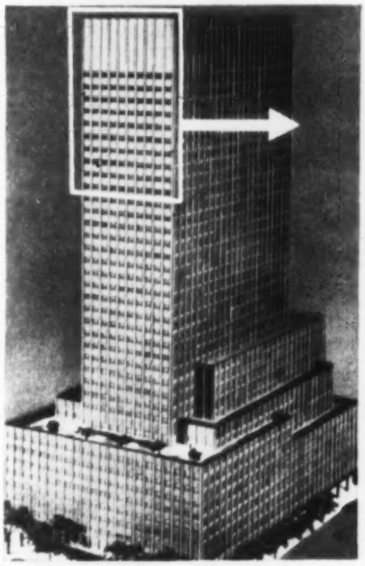
"The problem now facing the state," said the Foundation, "is that the demands for travel have far exceeded the rate at which adequate highway and street improvements have been made. The costs of road construction and maintenance have risen so that today's dollars are buying less than half of the amount of highway work they would have bought in the late '30s. The result has been major traffic jams, and an alarming rate of fatalities, injuries and property loss. And there is every indication that total travel will continue to increase—from a present rate of 10 billion vehicle miles annually to more than 17 billion by 1975."

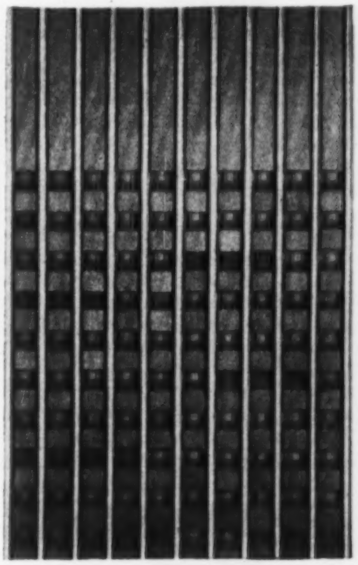
• Deficiencies spotlighted — Reorganization of the State Highway Department to provide an assistant commissioner and two deputy commissioners—one to head an engineering division and the other a business division — is recommended. And, a greater effort to attract and hold young engineers is urged.

The report listed principal deficiencies of the state's rural road system as sharp curves, steep grades and poor or narrow surfaces, constructed in the late '20s or early '30s. It warned that nearly all the mileage on the system "will become over-crowded or will wear out within 20 years."

As to the cities, the Foundation reported an urgent need for construction of freeways to move traffic into and through the four largest cities—76 mi of freeway costing an estimated $222 million. Other improvements needed in urban areas were listed as: "expansion in the use of one-way streets, alternate by-pass routes around congested areas, removal of parking during peak hours, improved channelization and signal controls and, when these devices fail to meet demands, the construction of new facilities."

State Highway Commissioner W. M. Leech was to discuss the Foundation's recommendations with the state legislative council this week. The state highway study commission will meet in the summer to draft its recommendations for the legislature.





Metal Diamonds Adorn Skyscraper

The world's tallest all-bolted skyscraper will also attract attention for another reason—just announced. It will have an unusual exterior facing—embossed, polished aluminum spandrels and 26-in.-wide white mullions.

Scheduled for completion in May 1957, the 38-story office building will occupy the Fifth Ave. block front between W. 52nd and 53rd Sts. in New York City (ENR Jan. 26, p. 28).

The aluminum spandrels for the new structure will be embossed with small diamond-shaped impressions to give a chain-mail-like surface. According to the owner-builder, Tishman Realty & Construction Co., Inc., the purpose of the design is to increase the strength and rigidity of each panel without increasing dead load, and also enhance the building's appearance.

Mullions will consist of a 20-in. band of either white structural glass or porcelain enamel set in a frame of 3-in.-wide polished aluminum.

Window widths of the new building, originally 6 ft, have been enlarged and now range from 6 ft 10½ in. to 7 ft 4½ in. The change allows wider rooms without reducing the number of interior space divisions.

Designed by New York architects Carson & Lundin, the building will offer over 1,000,000 sq ft of rentable office space. Demolition work is under way on the 61,000 sq ft site.

California flood damage puts a new . . .

Priority on Feather River

Spurred by winter flood damage in California, two of the state's water agencies last week recommended that Congress and the state legislature vote appropriations for water projects totaling some $74 million.

- The California Water Resources Board voted to ask Congress for a total of $47.2 million in flood-control appropriations rather than the $27.2 million proposed in President Eisenhower's budget (see p. 46).
- The California Water Project Authority recommended that the state legislature appropriate $26.8 million for an early start on the $1.5-billion Feather River Project when it convenes in budget session March 5.

The mammoth multi-purpose project (ENR Mar. 10, 1955 p. 21) primarily designed to carry water from surplus areas in northern California to drought areas in the south has gained widespread support since the December floods on the Feather River. Engineers state that had Oroville Dam, a key unit, been in operation, the floods would not have occurred.

Congress also is being asked for $100 million in federal funds for the Oroville Dam, as a flood-control contribution in a bill introduced by Congressman Clair Engle of California, chairman of the House Insular and Interior Affairs Committee.

• State funds would buy R-O-W—The $26 million-plus recommended by the Water Project Authority would permit acquisition of rights-of-way for the Oroville Dam reservoir and completion of construction plans, relocation of the Western Pacific Railroad tracks and state highway now located in the site area and $900,000 for purchase of a site for the San Luis Reservoir in the San Joaquin Valley. The latter reservoir would be used as a storage unit for Feather River water to be transported into southern California.

The authority's recommendation, however, limits the San Luis Reservoir site purchase fund. It could not be used until July 1, 1957, or until it has been determined that the state will construct the initial unit of the San Luis Dam rather than the federal government. There are federal government plans to use the San Luis Reservoir as a storage place for Trinity River Project water for irrigating farms on the San Joaquin Valley's west side. Suggestions have been made that the San Luis Dam be built to sufficient size to permit its use by both the federal and state governments. A report is due soon by the state concerning the Burçau of Reclamation's plans for the San Luis development.

• More federal money asked—Most of the flood-control requests for Congressional appropriations recommended by the Water Resources Board will be for works already authorized for construction.

The bulk of the funds, or a total of $31.4 million, will be requested for projects in the Los Angeles area where heavy rains late in January showed that area's flood disaster potential.

Construction starts will be called for on two new dams in the San Joaquin Valley, Success on the Tule River and Terminus on the Kaweah River. The program calls for appropriations to complete engineering studies on other San Joaquin Valley dams, including the new Melones on the Stanislaus River and new Hogan Dam on the Calveras River, plus a new dam in the Sacramento Valley, the Black Butte on Stony Creek.

The state also asks for a large construction appropriation on the Russian River project and an increase in funds allocated annually for flood-control work on the Sacramento River from Redding to the Sacramento Delta.

Redevelopment

S. C. ruling forbids use of area for business only

South Carolina's Supreme Court has ruled against the city of Columbia's plan to raze nine blocks of "blighted" area and re-sell the properties for commercial and industrial use.

The intended slum clearance and redevelopment project was to be carried out under the Federal Housing Act of 1954.

"The purpose here," the decision declared, "is not to provide better low-cost housing to the present occupants of the area, or indeed any housing at all, but to transform it from a predominantly low class residential area to a commercial and industrial area. . . . However desirable the object is from a municipal planning viewpoint, it cannot be attained by exercise of the power of eminent domain."

Excepted from the decision was a two-block area intended for use of the University of South Carolina, which the court held to be properly subject of the right of eminent domain.

Similar rulings have been made in Florida and Georgia, where the entire areas were to be sold to private interests. However, at least 21 states have upheld the right of housing authorities to re-sell private property taken by eminent domain in connection with redevelopment schemes. Moreover, the U. S. Supreme Court upheld the principle in a key decision in 1954 in reference to a Washington, D. C. redevelopment project (ENR Dec. 2, 1954, p 23).

The redevelopment provisions of the housing law do not require that substandard housing be replaced with new housing, permitting industrial or commercial use of the area as long as it fits in with an approved city plan. Amendments of 1955 even permit open land to be redeveloped in this manner.

21-Mile Bridge-Tunnel Considered by Virginia

Virginia state legislators are talking seriously about a plan to connect Virginia's Eastern Shore area on the Delmarva peninsula with the state's "mainland" to the south, across the 21 mi of open water that form the mouth of Chesapeake Bay.

The two areas are now connected by ferries operating between the peninsula hamlet of Kiptopeke and Little Creek—near Norfolk. It was estimated that a bridge-tunnel could be built over a slightly less than 21-mi length. The project would be financed out of revenue bonds.

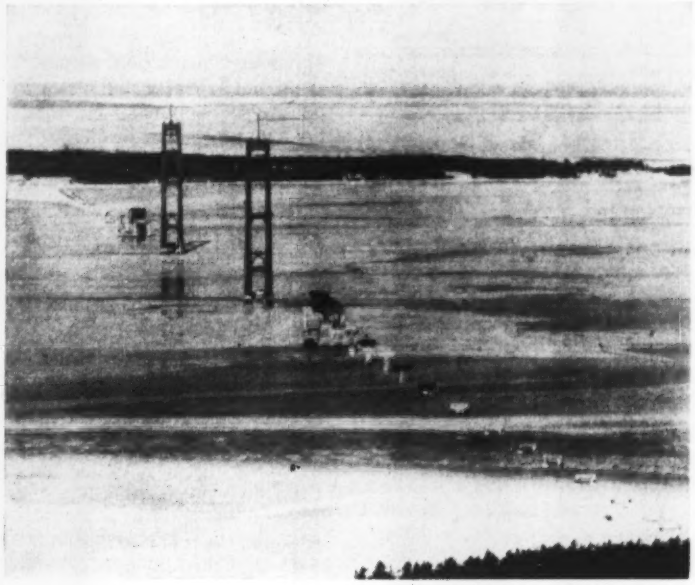
Legislation has been introduced in state legislature to appropriate up to $500,000 for surveys of the proposal.

$6.3-Million Parking Plan Recommended for Ft. Wayne

Construction of six new parking facilities, at a cost of more than $6 million for Fort Wayne, Ind. by 1965, has been recommended by Wilbur Smith and Associates, New Haven, Conn.

Five of the proposed facilities would be five-level open-deck type garages, estimated to cost $5.9 million and provide 2,214 parking spaces. The sixth, a 175-space parking lot would cost $484,000 for land and clearing the site.

It was suggested that the city acquire the properties and proceed with construction, issuing bonds to finance the cost. The facilities would then be leased to a non-profit group of business interests.



Progress Report on Mackinac Bridge

By D. B. Steinman

In the land of Hiawatha,
Where the white man gazed with awe
At a paradise divided
By the Straits of Mackinac.

Through the depths of icy water,
Battling tides around the clock,
Men are dredging, drilling, blasting,
Driving caissons down to rock.

Fleets of freighters bring their cargoes
From the forges and the kilns;
Stone and steel—ten thousand barge-loads—
From the quarries, mines, and mills.

Now the towers, mounting skyward,
Reach the heights of airy space.
Hear the rivet-hammers ringing,
Joining steel in strength and grace.

High above the swirling currents,
Parabolic strands are strung;
From the cables, packed with power,
Wonder-spans of steel are hung.

Generations dreamed the crossing;
Doubters shook their heads in scorn.
Brave men voted that they would build it—
From their faith a bridge was born.

There it spans the miles of water,
Speeding millions on their way—
Bridge of vision, hope, and courage,
Portal to a brighter day.

Cooler N.Y. Hotels

Hilton to spend $3 million on air conditioning rooms

Hilton Hotels Corp. is spending $2.7 million principally for year-'round air conditioning of the Waldorf, and Statler Hotels in New York City, this year, according to Joseph P. Binns, vice president.

Most of the money will go toward making the 2,200-room Statler the largest completely air-conditioned hotel in the world. (The Statler is the fifth largest hotel in the world.) By June 1, it will have 500 air-conditioned rooms, and the entire job will be completed by year's end.

Both heating and cooling will be achieved with steam purchased from the New York Steam Co. Two absorption-type refrigerating units, each with a cooling capacity of 670 tons, located on the roof of the building, will provide chilled water, which will be fed to under-window units in each room. Supply air will be circulated to these room units through a high-velocity conduit system. Carrier Corp. will supply the absorption equipment and room units.

Jaros, Baum & Bolles and Krey & Hunt are consulting engineers. Charles Herman Construction Co. is the general contractor, Alvord & Swift the mechanical contractor, S. J. O'Brien the electrical contractor and C. H. Cronin Co. the plumbing contractor.

At the Waldorf, which now has 430 air-conditioned rooms, another 400 will be equipped by June. Other installations also are in progress at the New Yorker, Plaza and Roosevelt—all part of the Hilton chain.

Ohio Selects Consultant For 'Seaway' Road Study

The Ohio State Highway Department has awarded a $75,000 contract for preliminary engineering on a 100-mile superhighway between Lake Erie and the Ohio River.

Michael Baker, Jr., Rochester, Pa., consulting engineer, will study the best route and estimate costs. The proposed road will extend from Ashtabula to East Liverpool, and will be a limited access highway with a two-lane roadway on four-lane right of way.

The first phase of the engineering work will be a study of an 8 to 10 mile stretch from the Lake Erie shore to a point south of Ashtabula. This small section is to be coordinated with the proposed interchange of the second Ohio Turnpike project and Rt. 46 (ENR Feb. 2, p. 30).

Federal Water Resources Program

Proposed Fiscal Year 1957 Starts

Project Location (Project already authorized except as noted by asterisk)	**Total estimated cost**	**Requested for FY 57**
	(Thousands of dollars)	
ARMY CORPS OF ENGINEERS		
Navigation		
Ketchikan Harbor, Alaska	$ 3,670	$ 500
Inland Waterway, Delaware River to Chesapeake Bay, Del. & Md. (Summit Bridge)	6,200	1,000
Intracoastal Waterway, Jacksonville to Miami, Fla.	3,222	200
Savannah Harbor, Ga.	415	415
Scarboro River, Maine	205	205
Fall River Harbor, Mass.	1,620	500
Houghton-Hancock Bridge, Michigan	1,672	500
Delaware River, Philadelphia, Pa., to Trenton, N. J.	60,900	6,000
Oswego Harbor, N. Y.	2,570	500
Brazos Island Harbor, Tex.	3,760	400
Port Arkansas-Corpus Christi Waterway, Tex.	2,790	330
Thimble Shoal Channel, Va.	820	820
Milwaukee Harbor, Wis.	130	130
Great Lakes Connecting Channels	110,000	5,000*
Flood control		
Gold Creek, Alaska	428	393
Muscatine, Iowa	920	300
Sabula, Iowa	314	284
Abilene, Kans.	580	200
Salina, Kans.	1,470	400
Topeka, Kans.	13,400	400
Worcester Division, Mass.	5,030	840
Battle Creek, Mich.	4,700	500
Belzoni, Miss.	286	243
Canton, Mo.	1,340	275
Endicott, Johnson City and Vestal, N. Y.	4,840	1,030
Marmarth, N. Dak.	240	217
Amazon Creek, Oreg.	953	100
Johnson Creek, Oreg.	442	100
Reynoldsville, Pa.	615	578
Woonsocket, R. I.	2,020	600
San Antonio Channel, Tex.	14,700	800
Thomaston Res., Conn.	16,000	360
East Brimfield Res., Mass.	5,700	340
Hodges Village Res., Mass.	4,350	360
Dyberry Res., Pa.	7,630	600
Prompton Res., Pa.	5,860	550
Stillwater Res., Pa.	9,200	600
East Barre Res., Vt.	3,750	800
North Springfield Res., Vt.	9,900	500
Townshend Res., Vt.	10,800	420
Waterbury Res., Vt.	860	808
Wrightsville Res., Vt.	2,660	1,000
BUREAU OF RECLAMATION		
Irrigation water supply and multi-purpose		
Collbran Project, Colo.	12,934	1,000
Rogue River Basin Project, Talent Division, Oreg.	19,260	2,400
Weber Basin Project, Utah	2,034	1,200
Upper Colorado River Basin Development	923,000	8,000*
Fryingpan-Arkansas Project, Colo.	156,541	5,000*
Ventura River Project, Calif.	27,700	4,400*
Washoe Project, Nev.-Calif.	41,600	2,200*

Actual construction monies to be spent on federal water resources and related development for irrigation, flood control, navigation and power during the fiscal year beginning July 1 are expected to reach $598.4 million. It is estimated that fiscal 1956 expenditures will total $626 million; however, indications are that the slight drop anticipated in federal construction will be more than balanced by state and local developments.

The table at the left lists the largest of 77 projects—most of them previously authorized—recommended for a 1957 start by the Eisenhower Administration. These new starts still depend, of course, upon favorable action by Congress. But neither Democrats nor Republicans are likely to do much trimming in this election year. Even last year, Congress added 80 new starts which were readily accepted by the Administration.

Also due to get under way in 1957—probably before June 30—are five flood-control reservoirs in the Northeast for which the President has requested fiscal 1956 money. These projetcs, their total estimated cost and appropriation requests are respectively: Otter Brook, N. H., $4,800,000 and $100,000; Barre Falls, Mass., $2,680,000 and $300,000; Ball Mountain, Vt., $16,600,000 and $300,000; Buffumville, Mass., $2,820,000 and $100,000 and Bear Creek, Penna., $17,900,000 and $300,000.

Those continuing projects for which more than $3,000,000 is programmed for fiscal 1957 are listed in the table at the right.

• **Spending by agencies**—The Corps of Engineers is expected to spend $449 million during fiscal 1957 on water resources and related development. It should be kept in mind that these "expenditure" amounts differ from requests for appropriations due to carry-overs from fiscal 1956, contingency reserves and exclusion of non-construction costs from the appropriation requests. The Corps will continue construction on 22 multiple-purpose projects, 96 predominately flood-control projects, six beach erosion projects, and 35 major navigation projects including 14 channel and harbor works. Construction will be initiated on 12 navigation and 27 flood-control projects.

The Bureau of Reclamation expects to spend $149.3 million for actual construction. To be continued are 53 irrigation and power projects, including 22 units of the Missouri River program. Rehabilitation and improve-

Budget at $598 Million

ment work on another 10 projects is scheduled for the coming fiscal year. In addition, five new starts are forecast by the bureau.

Over 80% of the coming year's money will be expended on continuing projects, and half of this will be paid out under new government contracts to be awarded. But there is much new business in the balance already under prime contract since many new subcontracts will be awarded.

• **Expenditures by categories**—A breakdown of estimated water resources spending by categories is as follows: flood control $180 million, beach erosion control $0.5 million, irrigation and water conservation $97.8 million, navigation facilities $106 million, and multi-purpose dams and reservoirs with hydro $214.3 million—including $9.4 million for partnership projects about equally divided between the Corps and reclamation. This totals $598.4 million.

Expenditures necessary to complete projects under way in fiscal 1957 will total a whopping $5.3 billion, split $3.1 billion for the Corps and $2.2 billion for the Bureau of Reclamation. However, the Upper Colorado River and Fryingpan-Arkansas River Projects constitute a big chunk of reclamation's backlog.

Related developments by such agencies as Dept. of Agriculture, International Boundary and Water Commission, Bureau of Indian Affairs, St. Lawrence Seaway Development Corp., TVA, and the various power administrations total $167.6 million. This breaks down as follows: flood control $22.9 million, irrigation and water conservation $2.9 million, navigation facilities $45.9 million, steam power plants (TVA) $32.4 million, and power transmission facilities $61.5 million.

• **Planning increase**—Expenditures for advanced engineering studies connected with water resources development are expected to increase slightly over 1956. Army Engineers are to spend $5.4 million and the Bureau of Reclamation $2.4 million.

Number of personnel employed by government agencies in investigation and construction work is somewhat of an indicator of future planning. In 1955 the Corps averaged 2,745 civilians in its investigation and construction activities, while 3,258 persons are scheduled for 1957. The Bureau of Reclamation anticipates a slight increase for employes in these categories, from 5,969 in 1955 to 6,211 in 1957.

Money Slated for Projects Under Way

Project Location	Estimated Expenditures FY 1956 (Thousands of dollars)	Estimated Expenditures FY 1957 (Thousands of dollars)
ARMY CORPS OF ENGINEERS		
Navigation		
Arkansas River & Tributaries	$ 4,455	$ 3,070
Missouri River, Sioux City to Omaha, Neb.	5,111	5,400
Missouri River, Omaha to Kansas City, Mo.	3,654	3,300
Gulf Intercoastal Waterway, Plaquemine-Morgan City, La.	1,521	4,500
New York & New Jersey Channels	3,070	3,500
Warrior Lock and Dam, Ala.	3,757	5,080
Illinois Waterway, Ill.	4,000	8,500
Markland Lock & Dam, Ind., Ky., & Ohio	1,250	5,000
Ohio River Locks & Dams (New Cumberland Locks & Dams, Ohio & W. Va.)	5,992	11,000
Ohio River Locks & Dams (Greenup Locks & Dams, Ky. & Ohio)	4,079	9,900
Flood control		
Los Angeles County Drainage Area, Calif.	13,391	16,500
Sacramento River Flood Control, Calif.	3,300	3,800
Central & Southern Florida	6,364	5,850
Cumberland Md. & Ridgeley, W. Va.	1,451	3,400
Toronto Reservoir, Kans.	2,500	4,800
Tuttle Creek Reservoir, Kans.	7,598	9,000
Markham Ferry Reservoir, Okla.	——	6,300
Oologah Reservoir, Okla.	1,000	3,000
Ferrells Bridge Reservoir, Tex.	2,537	4,300
Eagle Gorge Reservoir. Wash.	1,000	6,300
Sutton Reservoir, W. Va.	1,329	4,500
Multi-purpose projects		
Fort Gaines Lock & Dam, Ala. & Ga.	1,800	3,000
Buford Dam (part of Apalachicola, Chattahoochee & the Flint River System Ala., Fla. & Ga.	10,654	4,900
Hartwell Reservoir, Ga. & S. C.	3,000	10,000
Table Rock Reservoir, Mo. & Ark.	11,802	14,750
Garrison Reservoir, N. Dak.	14,557	16,892
The Dalles Lock & Dam, Oreg. & Wash.	51,689	52,000
Oahe Reservoir, S. Dak.	29,408	32,000
Cheatham Lock & Dam, Tenn.	6,139	4,200
Old Hickory Lock & Dam Tenn.	7,146	3,650
McGee Bend Dam, Tex.	1,478	4,022
Chief Joseph Dam, Wash.	12,884	12,726
Ice Harbor Lock & Dam, Wash.	1,000	5,000
BUREAU OF RECLAMATION		
Irrigation water supply and multi-purpose		
Palo Verde Diversion Project, Ariz.-Calif.	1,985	4,677
Central Valley Project, Calif.	12,624	22,039
Santa Maria Project, Calif.	1,000	6,171
Solano Project, Calif.	15,651	12,200
Palisades Project, Idaho	8,935	6,007
Middle Rio Grande Project, N. Mex.	9,278	3,500
Weber Basin Project, Utah	10,900	10,066
Columbia Basin Project, Wash.	12,500	13,850
Rehabilitation & improvement of 10 existing projects	2,307	3,312
Missouri River Basin Bostwick Division, Neb.-Kans.	6,790	4,690
Frenchman-Cambridge Division, Neb.	1,470	3,151
Glendo Unit, Wyoming	8,120	11,000
Helena Valley Unit, Mont.	1,501	4,000
Transmission Division	15,307	8,700
Yellowtail Unit Mont.-Wyoming	4,000	10,850

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Gardner-Denver Wagon Drills. Contractors have 42 of these drilling rock cuts on the project.

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on the Massachusetts Turnpike

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Crash Kills Three

American Engineers die in Iraq airplane crash

Charles F. Travis, 49, regional manager in the Middle East for the New York consulting firm of Tippetts-Abbett-McCarthy-Stratton; Norris Matthews, 33, resident engineer for the same firm in Iraq, and Harold E. Miller, who had been serving as chief engineer for the irrigation division of the Iraq Development Board, were killed Feb. 6 in an airplane crash near Baghdad.

The three men were returning to Baghdad after an inspection trip in the southern part of the country. Press reports said their small chartered plane was caught in a sudden sandstorm and crashed on landing.

Mr. Travis was educated at the University of Kentucky and New York University. His colorful engineering career included service (1930) with the Corps of Engineers on flood control and river engineering work; association with the engineering firm now known as Parsons, Brinckerhoff, Hall & Macdonald of New York, which involved engineering work in Brazil, Venezuela, Ecuador and Colombia; service as a lieutenant colonel in the Corps of Engineers in the European and Mediterranean war theaters. He joined TAMS in 1947, taking charge of work in Argentina before becoming regional chief in the Middle East, including projects in Greece, Turkey, Syria, Lebanon and Iraq.

Often described as a top diplomat as well as a top engineer, Mr. Travis held the Bronze Star with Oak Leaf and the Army's Meritorious Service Medal among other honors.

Mr. Matthews, a civil engineering graduate of Columbia University, served as a Navy line officer from 1943 to 1946, joined TAMS in 1948, and was transferred to Athens, as office engineer in 1951. He took charge of the firm's office in Baghdad in the fall of 1955.

Mr. Miller, 51, a civil engineering graduate of the University of Kansas, served with the Corps of Engineers and then joined the Bureau of Reclamation (1931). He remained with the bureau until 1941, when he left for military duty as a lieutenant colonel in the Army's General Staff Corps. He rejoined the bureau in 1946, and remained in its engineering force until he was sent to Iraq as a "loan" by the International Cooperation Administration.

The work that had been inspected by the three men was part of a huge irrigation and power development for the government of Iraq.

The Beaver Award

A beaver sitting on a pedestal at the foot of a dam (not the beaver's) comprises the design of the award chosen by the newly formed West Coast heavy construction organization to honor distinguished service to the industry. Sixteen such awards (ENR Feb. 2, p. 25) were made at the Beavers first annual dinner. Shown above receiving his award from Beaver President William A. Johnson (left) of the American Pipe Construction Co., is Nathan A. Bowers, retired Western Editor of Engineering News-Record and now a consulting engineer in Atherton, Calif.

Legislative Battle Looms Over Port Authority Bill

Efforts to set up a state-wide port authority in Maryland are running into rough water.

The plan—designed to help Baltimore fight competition from other East Coast cities and the St. Lawrence Seaway—is expected to go before the General Assembly this month (ENR, Dec. 29, 1955, p. 25). But because this is a short session, there are restrictions on the type of legislation that can be passed. And there may be legal obstacles to a port authority measure approved by the 30-day session.

If the bill is passed, it may be taken to the courts for a quick test case. If the courts decide passage of the bill was illegal in regular session, Governor Theodore R. McKeldin is expected to call a special session to re-enact it.

Two factors already indicate that any type of port authority bill will run into strong legislative opposition: (1) the Legislative Council (between-sessions arm of the Assembly) passed the bill along without recommendation; (2) automobile, petroleum and trucking organizations have come out flatly against the plan to finance the authority by raising gasoline taxes 3 cents per gal.

Engineers Certified

Sanitary engineers will be certified by a new board

The Joint Committee for the Advancement of Sanitary Engineering, after three years of effort, last week announced establishment of an American Sanitary Engineering Intersociety Board. Purpose of the board is to be certification of those sanitary engineers who want to be certified.

The idea had much of its early support from sanitary engineers in public health work, who seek recognition and advancement accorded other professionals in their field. The original suggestion was that a separate organization be established, a home for all sanitary engineers.

The committee has instead come up with a board, intended to advance the cause of the sanitary engineer, with members drawn from existing societies: American Society of Civil Engineers, American Society for Engineering Education, American Public Health Association, American Water Works Association and the Federation of Sewage & Industrial Wastes Association.

Officers of the newly created board are: Prof. Earnest Boyce, Chairman of the University of Michigan Department of Civil Engineering, chairman; William A. Hardenbergh, Editor, Public Works Magazine; R. S. Ranking, Manager, Sanitary Engineering Division, Dorr-Oliver Co., Stamford, Conn.; and Francis B. Elder, Engineering Associate, American Public Health Association.

Headquarters has been opened in the Engineering Societies Building, 33 West 39th St., New York City.

First step will be development of the certification process. A special committee has been named headed by Raymond J. Faust, executive assistant secretary of the American Water Works Association.

New Title and Increase To Woo College Engineers

Ohio State Highway Department hopes to strengthen its four-year training program for young engineers through a $20 monthly salary increase and the title of "engineer in training."

As a result of action by the state civil service commission, starting salaries go up from $360 to $380 a month; and men already in training have been raised to $400 a month.

Angus J. Gallagher, administrator of the state highway training program is now on tour of Ohio and out-of-state engineering colleges, attempting to sign 125 young engineers before June 15.

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Positive Traction: A finisher must maintain traction and steering control while pushing loaded trucks up steep grades, on slippery primes, on soft bases. Barber-Greene's crawler mounting assures this positive control.

Superior Maneuverability: Short over-all length and crawler mounting save valuable time in fast maneuvering or turning around, even in narrow streets or confined areas.

Ease of Control: The operator has an unrestricted view of truck dumping, material level at spreading screws, and finished mat.

Time-Saving Hopper: The receiving hopper is amply wide for fast truck changes and easy discharge, without spillage. It automatically feeds the spreading screws. No hand shoveling required.

World-Wide Parts and Service: Barber-Greene parts and service are available from local stocks on short notice, all over the free world.

See how this preferred finisher will cut your costs. Write for literature.

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LOWBOWL

SCRAPER

OUTLOADS COMPETITION IN ON-THE-JOB TESTS ON KANSAS TURNPIKE

1. TESTS WERE MADE on contractors' jobs on the Kansas Turnpike. They covered a period of three weeks. For each comparison, the competing units were loaded under similar conditions. Soil density tests were performed right in the loading area to provide an accurate measure of scraper load in pay yards.

3. JOB STUDIES showed that the new turbocharged 300 HP DW21 Tractor had the "go" to equal or beat other units in cycle time while carrying more pay yards. Other features contributing to this unit's success were large 29.5-29 tires, an efficient power train, synchro-safe brakes and the fast, responsive No. 27 Cable Control.

2. FIELD ENGINEERS weighed load after load as the competing units passed over a portable platform scale. By subtracting average empty weight from average gross weight, they determined average net load weight. In every test, the No. 470 Scraper with exclusive Caterpillar Lowbowl design consistently carried larger payloads.

4. LOWBOWL DESIGN, developed by Caterpillar, is a feature of the No. 470 Scraper. With this new concept, the bowl has been widened and lengthened, yet its depth has been decreased. But Lowbowl design is more than just dimensional changes. As the tests show, material is loaded with less resistance clear out to the end of the loading cycle.

TEST RESULTS

No. 470 Lowbowl Scraper (18 cu. yd. struck capacity) vs Competition

No. 470

AVERAGE
LOAD

18.1

BANK CU. YD.

Scraper A

18 cu. yd. struck capacity

AVERAGE LOAD

14.8

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.3 bank cu. yd. per load

Test conditions: Damp silty clay—density: 3300 pounds/cu. yd. **Weight Comparisons:** Average net load, pounds: No. 470—59,840; Scraper A—48,675.

Comments: On one load, the operator of Scraper A was asked to obtain maximum heap. It took 2.40 minutes of push loading to pick up a load which weighed 58,875 net pounds—less than the average load carried by the No. 470!

No. 470

AVERAGE
LOAD

18.1

BANK CU. YD.

Scraper B

Sideboarded —
18 cu. yd. struck capacity

AVERAGE LOAD

14.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.8 bank cu. yd. per load

Test conditions: Sandy clay. Density: 3100 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—56,225; Scraper B—44,400.

Comments: Average loading time for both machines was comparable. In total cycle time, the DW21 had the advantage. Its transmission provided a better match to rimpull requirements, and its shorter turns saved time on the fill.

No. 470

AVERAGE
LOAD

18.1

BANK CU. YD.

Scraper C

18 cu. yd. struck capacity

AVERAGE LOAD

14.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.8 bank cu. yd. per load

Test conditions: Damp silty clay. Density: 3300 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—59,840; Scraper C—47,290.

Comments: Scraper C, like Scraper A and the No. 470, has a rated capacity of 18 cu. yd. struck. On the job, where results, not rated capacities, are the true yardstick of a machine's ability, the No. 470 Scraper with Lowbowl design decisively outloaded the other two.

No. 470

AVERAGE
LOAD

15.6

BANK CU. YD.

Scraper D

Sideboarded —
18 cu. yd. struck capacity

AVERAGE LOAD

13.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

2.3 bank cu. yd. per load

Test conditions: Heavy clay. Swell about 40%. Density: 3440 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—53,550; Scraper D—45,630.

Comments: In the tests, Scraper D scored next best to the No. 470. *Scraper D is the "old" DW21-No. 21,* a unit that set records for high production at low cost the world over. Now, in the new DW21-No. 470, Caterpillar has produced a unit that's even better—and way ahead of competition!

Results on the job, not rated capacities, are the only true measure of a machine's ability to produce. Check the results here and judge for yourself how much the *extra yards* moved by the DW21-No. 470 Lowbowl Scraper can mean *profit-wise* to you!

Your Caterpillar Dealer has a complete report of this on-the-job test on the Kansas Turnpike—as well as similar reports from other sections of the country. Ask him to show you the advantages of Lowbowl Scrapers on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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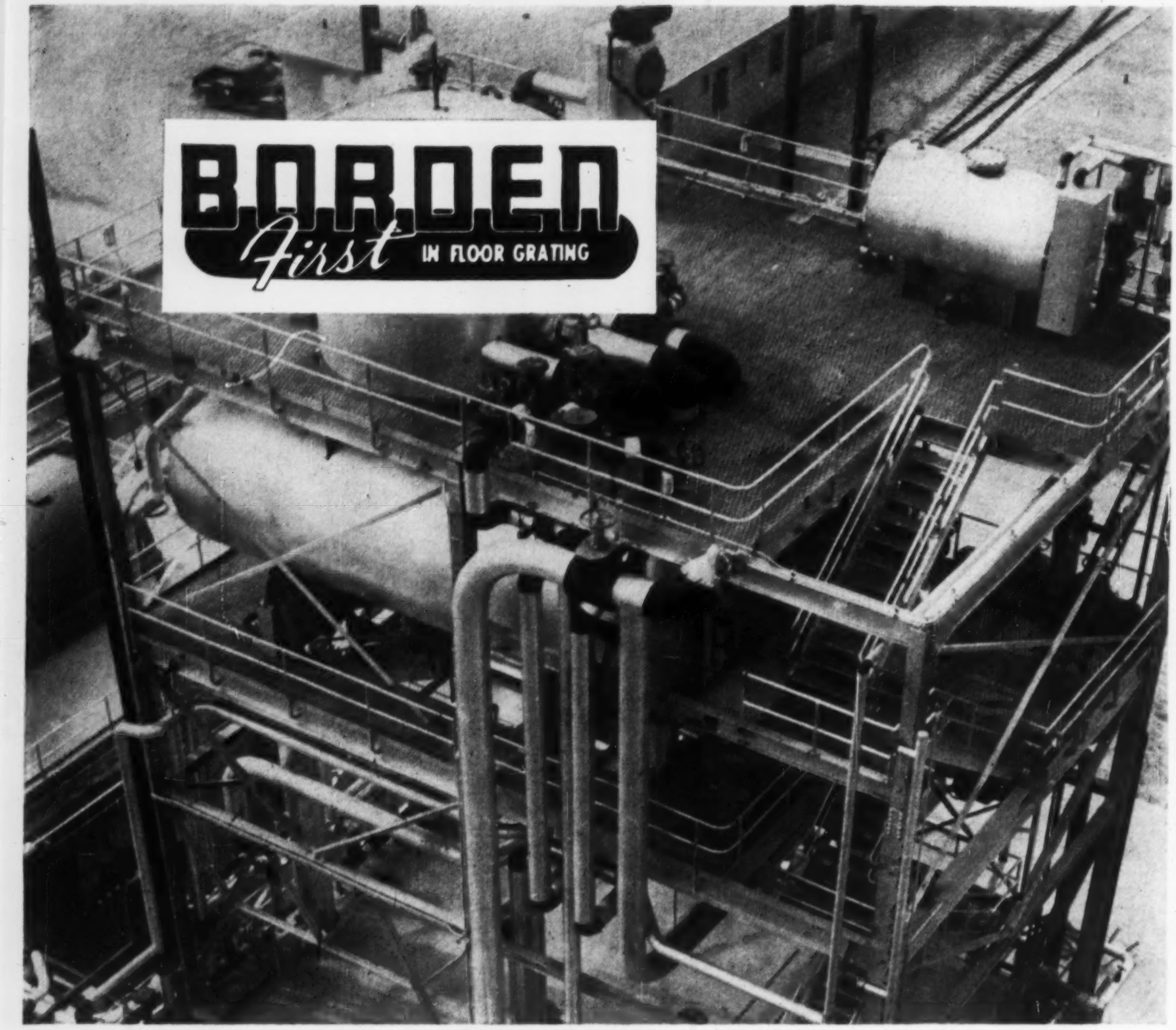

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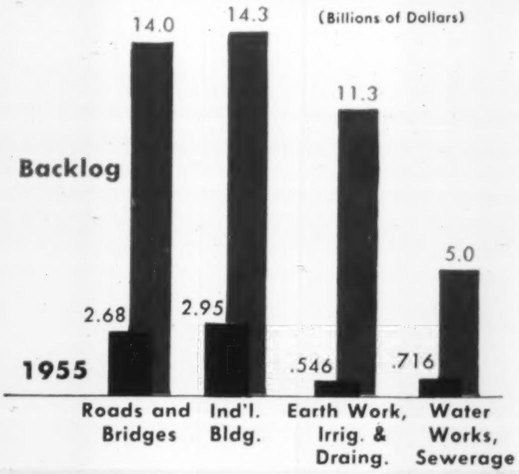
CITY AND STATE ....

ENR's 81st Annual Report and Forecast

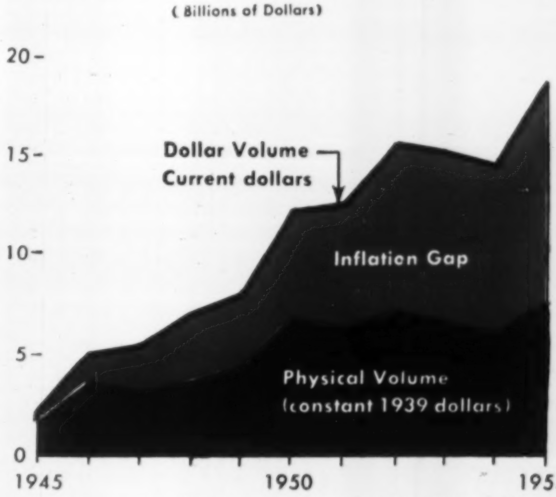
THE PROMISE

Huge backlogs of proposed projects, as typified here, are available to keep construction going . . .



THE PROBLEM

. . . But construction dollar buys less each year as inflation gap widens



The Construction Boom: Can It Continue?

Concluded from front cover

There can be no doubt that construction boomed in 1955. Contracts awarded rose an incredible 30% above the year before. Work put-in-place went up 12%. Ceilings of available manpower and materials were frequently bumped. All classes of construction contributed to the overall increase with new records of their own. Not only was it the biggest boom, it was also the best rounded one since the 20's.

Engineering construction contracts, exclusive of small jobs and single family housing, which had a boom of their own, totaled $18.7 billion, up $4.3 billion. But it was the things that were not built in 1955—definite projects already proposed and partly planned—which are important for 1956.

These future jobs, as compiled by ENR, now stand at an all-time high of $93 billion. Moreover, they tower far above 1955 contracts, as shown above for several typical categories. Here, unquestionably, is a large enough reservoir of future work to support construction at high levels for several years to come.

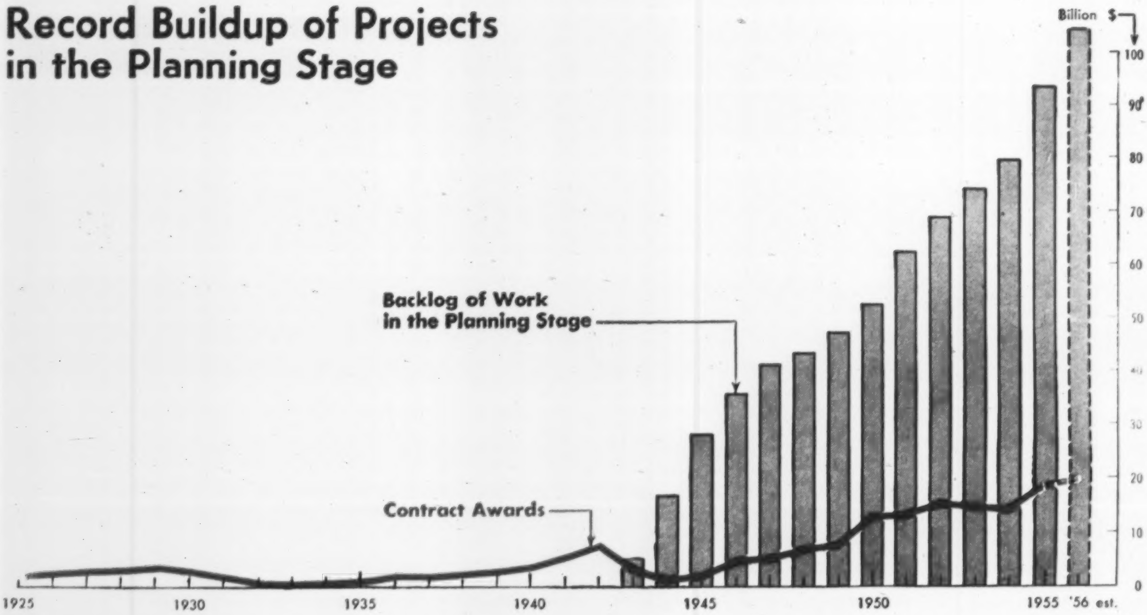
So, at least on the score of work to be done, the construction boom can continue. And were this alone the determinant, construction's twin satisfactions of being useful to mankind and a main prop to the nation's economy would be secure.

This promise for a bright future is, however, clouded by a problem and tempered by a responsibility—that of reducing the impact and debilitating effect of mounting costs. One has only to compare the actual dollar expenditures for construction over the past 10 years with the physical volume produced, as measured in dollars of constant purchasing power (see twin curves above), to appreciate what is happening. The distance between the curves—the cost rise or inflation gap—has widened by nine times over the past decade. The facilities that cost $18.7 billion in 1955 could have been built for half that in 1939.

There is danger in this widening spread, for the history of unchecked cost rises is always the same—a buyer's strike and then a depression. The consequences are dire enough to warrant sober thought by management every time it raises prices and by labor every time it demands another wage increase. The consequences are dire enough, too, that engineers and contractors should never relax their efforts to build more with every dollar.

This annual report, in the pages that follow, mirrors the economic weather that nourished construction so abundantly in 1955. It is the kind of weather that will foster additional growth in 1956 if the clouds of further cost increases can be dissipated by the new techniques of design and construction, which are also presented. Granted reasonable success in this effort, the construction boom can continue.

Record Buildup of Projects in the Planning Stage



Means . . . . . .

Construction Will Keep Booming in '56

This year will be the biggest ever in new business for the construction industry. The boom which saw heavy construction contracts climb 30% to an all-time high of $18.7 billion during 1955 is off to still greater heights in '56. Awards for the first six weeks of the year top '55 by a thumping 42%. Though this rate of rise will not be maintained during the balance of '56, the year's total looks like a sure bet to top $20 billion and score at least a 7% increase over 1955's record.

Backing up the bright prospects for this year is the rapid growth in the backlog of heavy construction projects in the planning stage (see chart above). This backlog increased at its fastest rate in history during last year and by December 31 it reached a new high of more than $93 billion. Furthermore, the tremendous flow of new work which is piling up in design-offices shows no signs of dwindling. The volume of proposed work was especially heavy during the second half of '55, increasing 18% above the first half volume. And in January, the $3.1 billion in proposed work was 82% above the estimated cost of projects proposed during January '56.

New records for private, up 7%, and state and municipal contracts, up 15%, are forecast for this year. Federal awards are expected to rise 16% to the highest dollar volume since 1953 (see table).

Major types of construction which are expected to hit new highs in '56 are: highways up 19%; waterworks up 11%; sewerage up 9%; earthwork-irrigation-drainage up 28%; and commercial building up 9%.

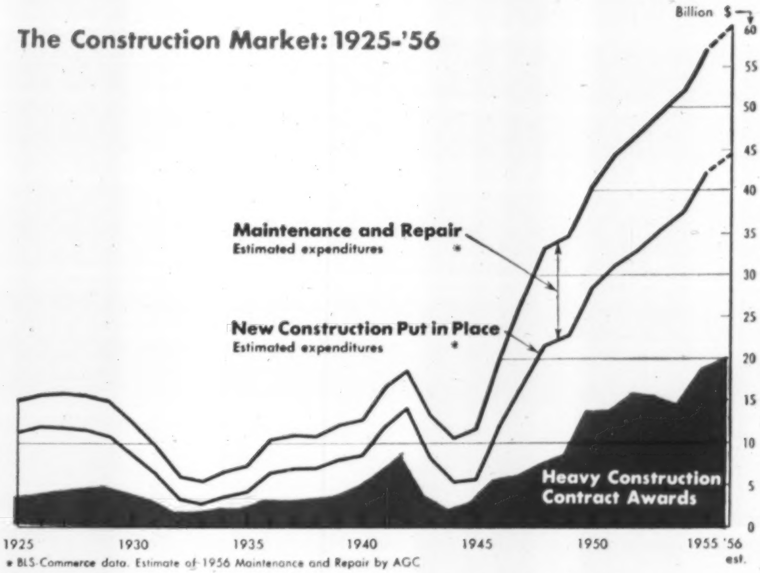
Private housing is expected to decline from its 1955 peak in terms of dollars and the number of units started in '56 will not match the more than 1.3 million homes begun during 1955. Though housing will get all the assistance it needs from government policies to keep the rate of starts between 1.2 million and 1.3 million this year, homebuilders themselves take a dim view of this goal. While a few of the NAHB-selected homebuilders meeting in Washington in January thought total housing starts might reach 1.2 million, most picked 1.1 million as the likely figure for '56 (ENR January 26 '56, page 99). Credit curbs (the government relaxed them a bit just before these builders met) and rising land costs which are pushing prices of new homes upward got the brunt of the homebuilders' blame for lower sales expectations for '56.

Total expenditures for new construction put in place and for construction maintenance and repair are also expected to reach new highs in '56. The US Departments of Commerce and Labor estimated that construction put in place will rise 5% to a record $44.5 billion this year. In addition, expenditures for maintenance and repair are counted on the rise to about $15.5 billion, according to estimates by the Associated General Contractors.

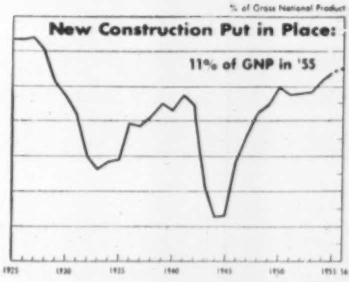
Tight money, higher interest costs and increased construction costs are all problems which will have to be solved if the construction boom is to keep rolling. In addition, there will also be the problem of sufficient materials to meet the needs of this expanding market. While increased capacity is now under construction—steel, cement, lumber, and aluminum are heading up this expansion—the construction industry may again face scattered shortages of key materials such as cropped up during '55.

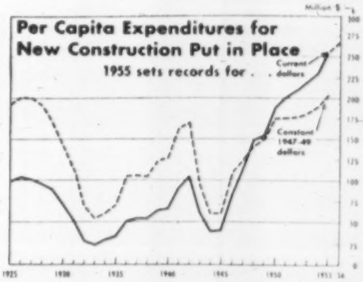
Heavy Construction Work Forecast: Up 7% to $20 Billion in '56

Type of work	Actual 1955	Fore-cast 1956	% Change '55-'56
All construction	$18,722	$20,040	+ 7
Private	11,672	11,950	+ 2
Public	7,050	8,090	+16
State & municipal	5,415	6,240	+15
Federal	1,635	1,900	+16
Public			
Waterworks	314	350	+11
Sewerage	402	440	+ 9
Bridges	545	600	+10
Highways	2,137	2,550	+19
Earthwork, irr., drain	546	700	+28
Building, excl. housing	1,741	1,850	+ 6
Housing	246	300	+22
Unclassified	1,121	1,300	+16
Private			
Housing	6,138	5,600	− 9
Commercial	1,656	1,800	+ 9
Industrial	2,951	3,700	+25
Unclassified	925	850	− 8



* BLS-Commerce data. Estimate of 1956 Maintenance and Repair by AGC





• **1955 Review**—The 1955 heavy construction boom was well balanced with all major types of work except public buildings and public housing scoring gains over 1954 dollar volume.

Outstanding during the year were: earthwork - irrigation - drainage which rocketed 61% to a record $546 million; private industrial building which shot up 57% to nearly $3 billion; and private mass housing which climbed 45% to a record $6.1 billion. Other big increases and new records came in waterworks which racked up a 28% gain; highways which rose 11%; commercial buildings up 17%.

Sewerage contracts went up a modest 4% and at $402 million were second only to the peak in 1953.

Public buildings other than housing dipped 1% and public housing awards were off 3%. The decline in public buildings reflected the disappointing performance of school awards which were only about 1% higher than in '54.

While heavy construction contract awards rocketed 30% ahead of '54 last year, BLS-Commerce estimated total expenditures *for work put in place rose about 13% to $43.2 billion. This compares with an estimated 7% increase in Gross National Product—total U. S. expenditures for goods and services—and demonstrates the tremendous lift that new construction is giving to the economy. In 1955, new construction accounted for nearly 11% of total GNP, the highest percentage since 1928 and not far below the all-time high of 12.1% in 1926 (see chart upper right). This year, construction expenditures are expected to play at least as important a role in the total economy as last year.

A look at per capita construction expenditures in '55 helps allay fears that the country is in danger of overbuilding (this rising backlog of proposed work is of course the most effective argument against this fear). Last year, we spent $268 on new construction for every man, woman and child in the country. This is a new all-time high, about 5% above the previous record in '54. However, if expenditures are adjusted for changes in construction costs, per capita expenditures topped the old record set in 1926 for the first time in 1955 (see chart upper right). This chart shows per capita construction spending in constant 1947-49 dollars rose to $203 in '55. This is just slightly under the peak of $203 in 1926. Furthermore, per capita expenditures during the whole 1946-54 period ranged from $146 to $190, which is well below the old peak years of 1926-27.

Private Industrial Building Rockets 57%

Sharp increases in expansion of basic industries spark upturn. Dollar total of private work is third highest on record. Federally-owned industrial plant awards also show substantial rise.

	1953		1954		1955	
Industry	No.	Value	No.	Value	No.	Value
Transportation Service						
Railroad	64	$27,620,000	18	$10,485,000	16	$8,911,000
Automotive	240	55,515,000	152	41,393,000	121	39,918,000
Public Utilities	123	700,921,000	87	348,037,000	108	729,248,000
Process Industries[1]	551	917,737,000	414	728,686,000	459	1,174,462,000
Food Industries[2]	368	151,580,000	407	180,357,000	227	108,181,000
Metal Refining & Rolling	37	573,287,000	24	72,939,000	30	116,731,000
Metal Working Plants						
Auto Factories	33	282,935,000	27	36,065,000	33	174,826,000
Aircraft Factories	38	29,165,000	35	41,855,000	51	39,289,000
Foundries	17	2,191,000	8	1,687,000	10	3,747,000
Mach. & Mach. Parts	471	186,086,000	369	218,806,000	355	271,923,000
Radio, TV & Electronics	28	24,801,000	17	5,901,000	26	20,417,000
Textiles (excl. rayon)	91	27,845,000	45	20,185,000	37	29,117,000
Wood Industries	55	8,568,000	49	13,638,000	41	13,912,000
Miscellaneous						
General Factories	866	181,359,000	595	153,667,000	559	218,713,000
Refrig. & Cold Stor.	16	8,519,000	10	2,608,000	9	1,383,000
Total, priv. financed	**2,998**	**$3,178,129,000**	**2,257**	**$1,876,309,000**	**2,082**	**$2,950,778,000**
Fed. Owned Indus. Plts.	190	$276,037,000	151	$183,260,000	145	$240,144,000

[1] Includes distilleries. [2] Includes breweries, frozen food plants and lockers.

Private Unclassified Sets Record in '55

Private unclassified awards climb 58% as hydro-electric power plants, transmission lines, railroad and telephone construction surge upward.

Private	1953	1954	1955
Transmission Lines	$51,233,000	$39,082,000	$50,848,000
Pipelines	525,933,000	379,146,000	324,287,000
Railroads	39,501,000	12,296,000	47,462,000
Telephone	22,783,000	20,152,000	36,507,000
Drive-in Theatres	2,938,000	7,786,000	1,730,000
Radio & TV	15,896,000	5,833,000	4,727,000
Airports	9,786,000	1,145,000	4,695,000
Other[1]	186,096,000	119,558,000	451,316,000
Total Private	**857,169,000**	**584,998,000**	**924,592,000**
Public—Federal			
Airports, Airbases	125,821,000	171,806,000	190,150,000
Hangars, Buildings	248,402,000	240,620,000	286,943,000
Airport Housing	25,736,000	28,240,000	49,676,000
Airport Facilities & Util	85,179,000	95,556,000	133,002,000
Shipyards	38,627,000	5,787,000	17,822,000
Other	68,516,000	94,000,000	135,174,000
Total Federal	**592,281,000**	**636,009,000**	**812,767,000**
Public—State & Municipal			
Airports	41,251,000	25,904,000	50,957,000
Subways, Tunnels	36,310,000	92,084,000	123,222,000
Other	135,483,000	125,570,000	134,540,000
Total State & Municipal	**213,044,000**	**243,558,000**	**308,719,000**
Total Public	**805,325,000**	**879,567,000**	**1,121,486,000**
Total Unclassified	**$1,662,494,000**	**$1,464,565,000**	**$2,046,078,000**

[1] Includes private-owned hydro-electric power plants

Contracts Zoom 30% to Record $18.7 Billion in 1955

All regions gain over '54 as Middle West leads with 50% rise in awards. New highs are set by waterworks, highways, earthwork-irrigation-drainage, commercial building and private mass housing.

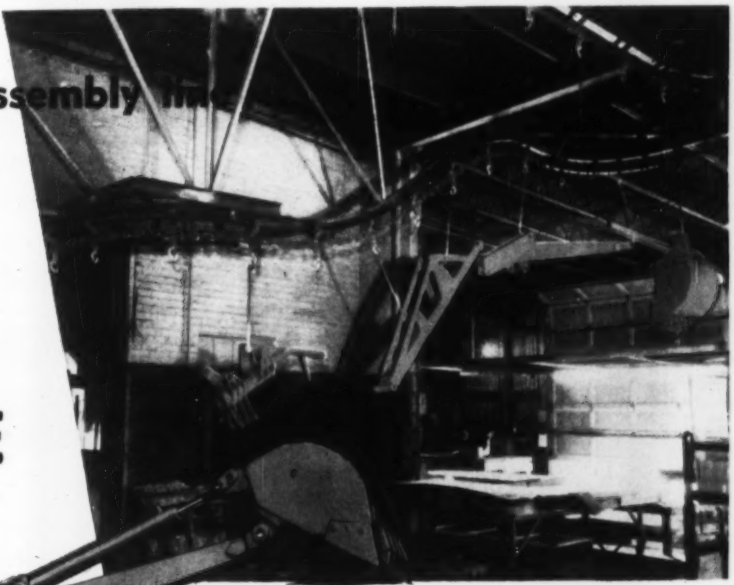
Thousands of dollars (,000 omitted)

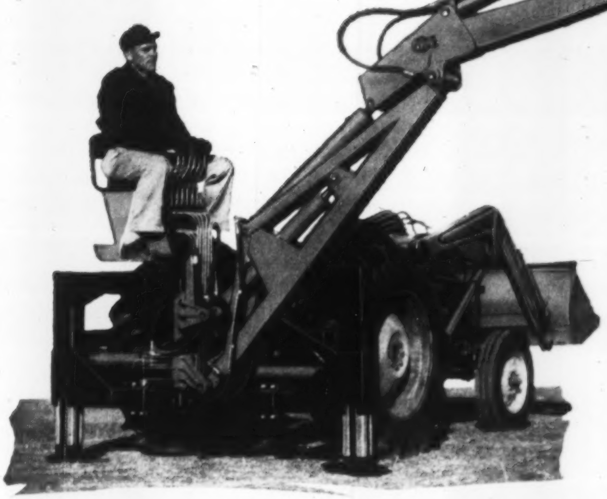
States	Public Works Contracts								Federal government work	Private Contracts			Construction		1955 Total 52 weeks	1954 Total 52 weeks	% Change '54-'55
	Waterworks	Sewerage	Bridges*	Earthwork irr.-drain.	Streets and roads	Buildings		Unclassified†		Industrial buildings	Commercial Buildings		Private	Public			
						Residential	Other				Residential	Other					
UNITED STATES																	
1955	**314,157**	**401,859**	**545,563**	**546,123**	**2,136,669**	**246,159**	**1,740,505**	**2,046,078**	**1,634,757**	**2,950,778**	**6,138,412**	**1,655,549**	**11,672,059**	**7,049,793**	**18,721,852**	......	+30
1954	245,228	387,890	510,657	338,781	1,918,870	255,032	1,761,972	1,464,565	1,285,679	1,876,309	4,232,027	1,420,702	8,125,299	6,286,734	......	14,412,033	......
% Change	+28	+4	+7	+61	+11	−3	−1	+40	+27	+57	+45	+17	+44	+12	+30	......	......
NEW ENGLAND																	
Me.	......	517	2,959	1,036	10,532	......	2,313	29,440	29,579	15,948	728	1,450	18,213	46,710	**64,923**	96,096	−32
N. H.	571	498	654	480	15,261	637	3,923	14,803	14,330	2,247	1,975	700	6,032	35,717	**41,749**	50,418	−17
Vt.	416	......	986	......	4,495	1,343	3,103	3,117	3,253	1,941	924	4,304	7,169	13,460	**20,629**	11,556	+79
Mass.	5,231	7,617	21,047	7,444	176,199	6,124	62,348	62,176	65,012	49,520	91,961	31,582	174,665	346,584	**521,249**	340,800	+53
R. I.	348	2,641	4,043	417	9,653	......	6,178	8,472	7,763	37,100	3,730	2,950	43,930	31,602	**75,532**	34,763	+117
Conn.	5,725	5,739	15,907	1,847	21,786	4,563	40,353	16,731	12,835	29,226	41,570	19,125	95,622	106,950	**202,572**	200,245	+1
1955	**12,291**	**17,012**	**45,596**	**11,224**	**237,926**	**12,667**	**118,218**	**134,739**	**132,772**	**135,982**	**140,888**	**60,111**	**345,631**	**581,023**	**926,654**	......	+26
1954	14,777	27,153	47,066	4,109	123,883	10,064	147,216	91,017	92,505	95,703	94,156	78,734	272,764	461,114	......	733,878	......
% Change	−17	−33	−3	+173	+92	+26	−20	+48	+44	+42	+50	−24	+27	+26	+26	......	......
MIDDLE ATLANTIC																	
N. Y.	37,777	38,946	32,675	163,283	125,310	85,773	159,685	126,214	79,613	187,261	1,080,746	284,073	1,553,458	768,285	**2,321,743**	1,557,745	+49
N. J.	524	33,428	44,441	7,360	65,491	4,461	43,947	27,868	27,403	85,736	502,185	43,039	631,260	227,220	**858,480**	531,239	+62
Pa.	16,724	16,433	28,266	5,498	109,727	2,204	64,237	30,606	14,398	265,605	384,624	126,604	796,017	254,511	**1,050,528**	1,194,064	−12
Md.	13,125	9,125	5,757	3,248	29,016	5,410	53,168	94,899	48,980	66,677	108,061	62,009	242,574	207,921	**450,495**	365,569	+23
D. C.	5,509	3,184	1,311	839	5,213	......	29,406	1,187	32,877	2,620	31,266	23,835	57,721	46,649	**104,370**	105,238	−1
Del.	242	648	306	2,161	3,415	617	1,270	9,291	10,891	114,797	72,728	8,417	196,689	17,203	**213,892**	90,023	+138
1955	**73,901**	**101,764**	**112,756**	**182,389**	**338,172**	**98,465**	**351,713**	**290,065**	**214,162**	**722,696**	**2,179,610**	**547,977**	**3,477,719**	**1,521,789**	**4,999,508**	......	+30
1954	29,089	88,573	140,462	16,498	449,769	90,839	410,599	181,887	189,128	365,723	1,578,350	492,089	2,447,984	1,395,894	......	3,843,878	......
% Change	+154	+15	−20	+1,006	−25	+8	−14	+59	+13	+98	+38	+11	+42	+9	+30	......	......
SOUTH																	
Va.	2,270	9,419	4,901	1,083	25,616	6,083	24,128	32,959	36,784	69,489	113,221	32,178	226,473	94,874	**321,347**	320,693	+0.2
W. Va.	1,025	2,842	3,216	9,726	10,753	1,771	6,215	1,607	9,989	89,384	560	7,171	98,558	35,712	**134,270**	83,751	+60
N. C.	5,139	4,224	10,382	1,329	30,848	4,342	22,428	24,381	37,502	25,818	935	5,157	33,897	101,086	**134,983**	124,365	+9
S. C.	1,952	2,143	6,016	1,739	15,813	558	18,857	37,288	39,477	25,532	4,115	1,979	32,708	83,284	**115,992**	85,233	+36
Ga.	2,147	776	9,424	10,340	27,088	......	43,747	23,607	34,564	49,396	1,500	16,747	69,636	115,136	**184,772**	223,377	−17
Fla.	894	12,549	12,145	8,639	41,836	......	19,569	74,118	47,449	31,949	34,935	3,807	108,447	131,994	**240,441**	336,756	−29
Ala.	1,381	3,995	6,179	8,752	18,727	516	55,449	53,775	70,424	40,469	6,765	3,695	97,988	101,715	**199,703**	113,724	+76
Miss.	......	......	1,780	3,249	19,842	......	209	17,450	11,745		......	......	9,713	32,817	**42,530**	67,212	−37
La.	3,716	4,694	33,866	18,563	52,992	4,278	45,959	42,655	44,625	7,387	2,497	16,940	36,972	196,575	**233,547**	203,611	+15
Ky.	2,469	9,358	3,447	17,872	49,979	13,315	19,514	52,719	34,356	51,270	18,635	8,106	127,030	119,654	**246,684**	177,758	+39
Tenn.	1,515	3,394	2,494	4,004	24,574	3,727	57,127	34,033	44,000	17,000	......	10,421	57,773	100,516	**158,289**	155,904	+2
1955	**22,508**	**53,394**	**93,850**	**85,296**	**318,068**	**34,590**	**313,202**	**394,592**	**410,915**	**407,694**	**183,163**	**106,201**	**899,195**	**1,113,363**	**2,012,558**	......	+6
1954	40,903	53,301	124,721	52,306	314,458	40,492	315,263	254,778	263,329	284,307	277,177	134,678	771,925	1,120,459	......	1,892,384	......
% Change	−45	+0.2	−25	+63	+1	−15	−1	+55	+56	+43	−44	−21	+16	−1	+6	......	......
MIDDLE WEST																	
Ohio	20,704	29,764	18,861	9,775	129,606	6,198	70,297	40,996	48,620	291,270	418,668	97,379	827,152	306,366	**1,133,518**	722,539	+57
Ind.	4,739	19,715	2,058	251	78,918	578	24,973	5,626	6,962	181,895	100,558	25,580	309,425	135,466	**444,891**	402,084	+11
Ill.	26,303	23,757	28,316	3,999	70,966	28,238	61,742	38,391	19,233	187,964	752,405	169,677	1,117,753	274,005	**1,391,758**	777,098	+79
Wis.	5,526	14,433	7,772	1,066	50,160	884	39,031	13,723	14,910	79,892	9,019	29,636	119,055	132,087	**251,142**	226,657	+11
Mich.	14,587	19,733	17,608	259	62,948	10,465	97,371	42,907	23,474	123,367	468,619	108,654	724,557	241,961	**966,518**	666,179	+45
1955	**71,859**	**107,402**	**74,615**	**16,350**	**392,598**	**46,363**	**293,414**	**141,643**	**113,199**	**864,388**	**1,749,269**	**430,926**	**3,097,942**	**1,089,885**	**4,187,827**	......	+50
1954	38,841	84,035	74,963	10,188	383,062	33,084	284,575	91,747	78,042	442,869	1,044,215	306,978	1,815,227	979,330	......	2,794,557	......
% Change	+85	+28	−1	+51	+2	+40	+3	+54	+45	+95	+68	+40	+71	+11	+50	......	......
WEST OF MISSISSIPPI																	
Minn.	8,461	16,205	7,480	2,152	52,287	400	47,485	30,808	10,154	46,018	42,552	39,388	145,184	148,052	**293,236**	221,437	+32
Iowa	3,212	3,976	13,519	10,053	58,356	385	22,467	9,531	10,338	37,928	24,389	19,506	88,619	114,703	**203,322**	113,191	+80
Mo.	8,046	5,945	23,948	7,288	35,742	1,667	78,347	33,607	67,330	68,844	141,354	70,932	295,508	180,212	**475,720**	406,522	+17
Ark.	413	109	3,994	3,508	16,944	438	717	17,966	21,737	1,900	2,750	413	5,700	43,452	**49,152**	92,680	−47
N. D.	2,799	1,031	814	8,995	17,065	390	1,800	22,928	19,149	1,430	400	4,441	19,184	42,909	**62,093**	41,841	+48
S. D.	105	85	1,854	18,341	22,028	......	2,252	20,339	29,108	4,009	......	6,337	21,017	54,333	**75,350**	59,454	+27
Neb.	6,459	844	4,430	5,516	27,810	1,930	16,603	35,664	24,714	8,608	17,885	8,569	43,956	90,362	**134,318**	100,341	+34
Kan.	5,840	7,574	29,655	8,528	101,683	1,023	47,616	23,674	48,434	25,671	48,125	29,558	111,495	217,452	**328,947**	232,468	+42
Okla.	3,082	2,050	18,069	3,734	41,173	1,161	8,928	35,043	34,007	12,792	3,596	9,718	30,495	108,761	**139,256**	173,361	−20
Tex.	46,844	27,464	28,535	17,946	166,504	12,107	89,836	299,164	92,602	334,164	979,813	154,428	1,680,358	476,447	**2,156,805**	1,507,315	+43
Mont.	270	111	3,730	1,509	21,902	......	6,730	110,027	21,627	2,069	1,078	3,427	101,064	50,789	**151,853**	40,040	+279
Wyo.	335	......	809	3,655	14,149	......	4,319	8,955	7,563	6,075	1,800	......	14,780	25,317	**40,097**	59,582	−33
Colo.	6,700	1,493	1,898	1,751	22,420	3,444	30,630	8,704	23,288	54,517	67,403	26,129	153,353	71,736	**225,089**	298,374	−25
N. M.	184	68	......	3,652	12,482	3,167	9,237	24,250	26,347	2,975	......	4,195	15,781	44,429	**60,210**	88,330	−32
1955	**92,750**	**66,955**	**138,735**	**96,628**	**610,545**	**26,112**	**366,967**	**681,660**	**436,398**	**606,910**	**1,331,145**	**377,041**	**2,726,494**	**1,668,954**	**4,395,448**	......	+28
1954	84,066	75,224	75,491	105,004	420,107	54,539	312,134	611,005	376,358	492,015	904,274	301,077	2,068,598	1,366,338	......	3,434,936	......
% Change	+10	−11	+84	−8	+45	−52	+18	+12	+16	+23	+47	+25	+32	+22	+28	......	......
FAR WEST																	
Idaho	......	83	2,377	11,152	11,892	......	21,194	58,967	33,555	2,250	......	......	58,679	49,236	**107,915**	68,114	+58
Utah	308	4,397	992	3,573	13,004	986	13,006	13,441	16,675	24,427	1,894	1,417	30,386	47,059	**77,445**	78,416	−1
Ariz.	453	61	1,706	2,405	11,872	1,025	3,499	16,196	14,269	10,125	7,610	2,600	27,835	29,717	**57,552**	31,724	+81
Nev.	70	73	......	124	8,079	......	2,881	5,656	10,796	8,250	6,435	2,141	16,826	16,883	**33,709**	32,625	+3
Wash.	7,164	6,501	9,670	35,104	30,812	13,139	32,591	58,808	66,600	35,046	48,011	18,372	132,049	163,169	**295,218**	297,828	−1
Ore.	735	2,550	7,944	24,743	21,876	......	9,755	61,750	37,446	3,213	......	8,099	62,350	78,315	**140,665**	178,040	−21
Calif.	32,118	41,667	57,001	78,456	141,825	12,812	214,065	188,561	147,970	129,797	490,387	100,664	796,953	690,400	**1,487,353**	1,025,653	+45
1955	**40,848**	**55,332**	**79,690**	**155,557**	**239,360**	**27,962**	**296,991**	**403,379**	**327,311**	**213,108**	**554,337**	**133,293**	**1,125,078**	**1,074,779**	**2,199,857**	......	+28
1954	37,552	59,604	47,954	150,676	227,591	26,014	292,185	234,131	286,317	195,692	333,855	107,146	748,801	963,599	......	1,712,400	......
% Change	+9	−7	+66	+3	+5	+7	+2	+72	+14	+9	+66	+24	+50	+12	+28	......	......
CANADA																	
1955	**22,556**	**23,593**	**49,047**	**163,439**	**117,010**	**74,661**	**171,896**	**280,622**	**186,382**	**435,375**	**686,396**	**134,877**	**1,454,764**	**704,708**	**2,159,472**	......	+29
1954	26,492	18,182	21,215	39,871	69,162	37,273	187,375	364,473	136,750	275,947	504,950	134,192	1,214,474	464,658	......	1,679,132	......
% Change	−15	+30	+131	+310	+69	+100	−8	−23	+36	+58	+36	+1	+20	+52	+29	......	......

* Incl. private: Bridges, public $542,835 ('55) $499,394 ('54); private $2,728 ('55) $11,263 ('54); † Unclassified, public, $1,121,486 ('55) $879,567 ('54); private, $924,592 ('55) $584,998 ('54)

Right off the assembly line

THE *NEW* DAVIS BACK-HOE





MAKES A THOROUGHBRED COMBINATION WITH THE DAVIS LOADER

The Davis **Back-hoe is sold in combination** with **America's quality front-end tractor loader**...the loader that **is designed to make you more money because** it provides **for faster, smoother, more efficient** action. Get complete **details on the simplified** attachment of the Davis Back-hoe to the Davis Loader, and find out why you pay less than you would expect for this equipment.

BETTER 9 WAYS

This new quality-built Davis Back-hoe is an outstanding performer on jobs normally expected of a back-hoe. But, because of the following features, it does jobs that the ordinary back-hoe couldn't tackle...provides for unequalled operator comfort and vision... and it sells for a price that's far less than the average back-hoe.

1. It digs at right angles to either side of the tractor... to the rear... or at any spot in between.
2. Operator revolves with boom... always faces work without twisting.
3. Comfortable, well-padded seat with foot rest lessens operator's fatigue.
4. Digs 13 feet deep... dumps all the spoils to just one side, if desired.
5. Operator can always see where he is digging... even at maximum depth.
6. Can be detached or attached in less than five minutes... without sacrifice to rigidity.
7. Won't upset because extra wide frame has two individually controlled hydraulic stabilizers.
8. Full-floating pins used throughout. Lifetime sealed ball bearings used in king post.
9. Mass produced on assembly line basis for exceptionally low cost.

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Please send me literature on the Davis Back-hoe.... and Davis Loader.... to fit a .... tractor.

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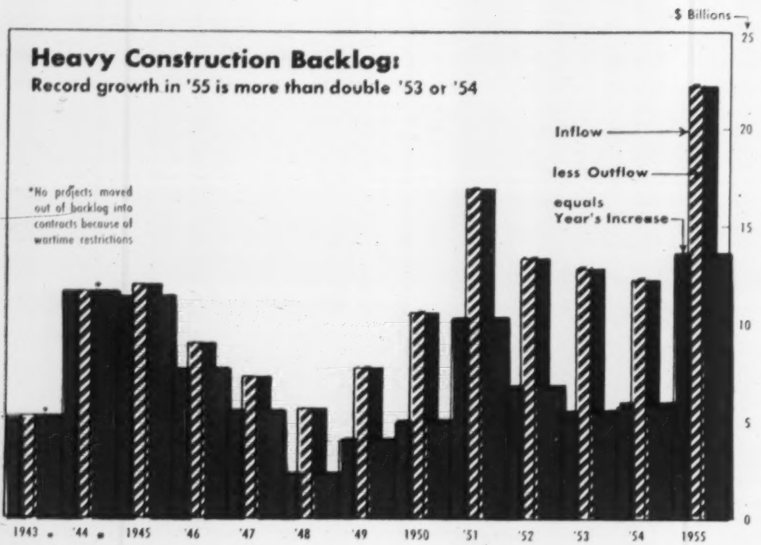

Heavy Construction Backlog:
Record growth in '55 is more than double '53 or '54

• **Proposed work**—The flow of new projects into the ENR backlog of proposed heavy construction rocketed to $24 billion during '55. This was 54% more than the estimated cost of all work proposed in '54. Furthermore, it was nearly three times the dollar value of all projects moving out of the backlog into contract status during the year. This unprecedented inflow of new jobs caused the ENR backlog total to grow at the fastest rate on record (see chart above).

All major types of work flooded into the backlog at a faster clip in '55 except private unclassified. Public works had the sharpest gain, up 67%, while private project volume increased 42% over '54. Flow into the backlog increased the most for: bridges 165%; earthwork - irrigation - drainage 140%; waterworks 97%; and private industrial building 84%.

• **Regions**—All regions took part in 1955's heavy construction boom. Contract volume rose above '54 in every region and backlogs of proposed work rose substantially (chart below).

New York and Texas led in '55 contracts with $2.3 billion and $2.2 billion, respectively. Awards rose more than 40% in both. California, Illinois, Ohio, and Pennsylvania topped $1 billion. (See page 58 for '55 contracts by states and type of work).

• **New England** heavy construction awards neared the $1-billion mark in '55 as contractors took on a record $927 million in awards, 26% more than in '54. Highway awards almost doubled while commercial buildings rose 50% and industrial buildings went up 47%. The backlog climbed 30% to top $5 billion.

• **Middle Atlantic** states had a 30% increase in contract dollar volume to almost $5 billion. St. Lawrence Seaway and Power projects contributed heavily to the very sharp increase in earthwork-irrigation-drainage awards, which were eleven times the 1954 volume. Private mass housing jumped 36% while industrial buildings nearly doubled. The backlog of proposed work rose to about $20 billion, second largest in the country.

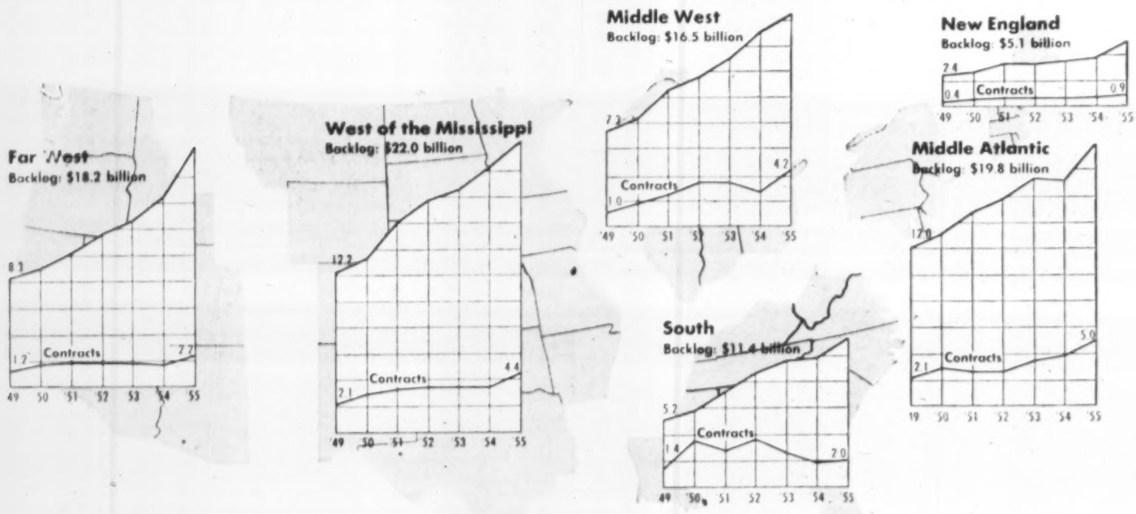
• **The South** recovered from its two-year decline with a moderate 6% rise, industrial building and private unclassified work playing a major role. The backlog rose to $11 billion.

• **Middle West** states racked up a tremendous 70% gain in private contracts which accounted for three-quarters of the $4.1 billion total for all types of work, up 50%. Private mass housing, up 65%, and industrial building, up 95%, were the prime movers. Every type of public work had higher award volume in '55 than '54.

• **The West of the Mississippi** chalked up a 28% increase in contracts last year. The spotlight was on Texas where awards jumped 43% to almost $2.2 billion and close to half of this region's grand total. The backlog of proposed work continued to rise.

• **Far West** states established a new beachhead last year, passing $2 billion in total award volume. This was 28% more than '54 and was sparked by a 50% jump in private work.

All Regions Share in Backlog and Contract Award Rise During 1955



Planning Future Construction—$93-Bil. Backlog in Dec.

Engineering construction, plans underway but not yet under contract, grows at its fastest rate in '55

Summary of projects on file with ENGINEERING NEWS-RECORD covering proposed construction estimated to cost these minimum amounts or more: waterworks, excavation and irrigation, $34,000; other public works, $73,000; industrial buildings, $93,000; other buildings, public and private, $344,000

New projects proposed during 1955 . . . . (millions) $24,022
Projects moved out of backlog into contracts . . . " 8,844

Projects abandoned and removed from backlog . . . (millions) $1,826
Net increase in backlog during 1955 . . . . " 13,352

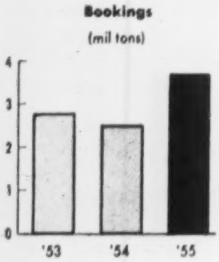
Thousands of dollars (000 omitted), Dec. 31, 1955

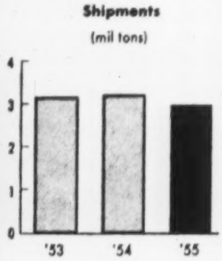
	Public Works Projects								Private Projects			Construction				
ates	Water-works	Sewer-age	Bridges (includes private)	Earth-work irr.-drain.	Streets and roads	Buildings	Unclassi-fied	Federal govern-ment work	Industrial buildings	Comm'l buildings	Unclassi-fied	Private	Public	1955 TOTAL	1954 TOTAL	Change '54-'55
UNITED STATES																
1955	**1,990,206**	**2,988,101**	**2,760,186**	**11,292,827**	**11,313,089**	**16,405,054**	**7,245,770**	**12,740,719**	**14,302,163**	**15,766,922**	**8,989,103**	**39,136,239**	**53,917,182**	**93,053,421**		+17
1954	1,647,124	2,915,812	2,342,421	9,334,066	8,598,505	15,111,176	6,676,782	12,360,931	11,740,258	12,946,751	8,388,802	33,156,993	46,544,704		79,701,697	
% Change	+21	+2	+18	+21	+32	+9	+9	+3	+22	+22	+7	+18	+16	**+17**		
NEW ENGLAND																
Me.	319	5,401	2,094	1,830	67,225	42,899	67,163	51,635	14,614	23,205	10,825	48,644	186,931	**235,575**	236,164	−0.2
N. H.	3,374	4,711	37,369	2,651	6,675	34,611	34,002	25,714	14,329	28,250	10,204	52,783	123,393	**176,176**	173,640	+ 1
Vt.	1,531	1,751	1,304	81,376	33,220	25,975	3,426	81,521	3,055	8,550	3,223	14,828	148,583	**163,411**	159,953	+ 2
Mass.	27,378	59,371	102,632	36,888	1,245,897	619,147	217,993	218,127	129,442	287,121	94,381	510,944	2,309,306	**2,820,250**	1,841,706	+53
R. I.	6,648	37,544	32,566	2,287	68,454	92,447	31,286	64,291	48,331	51,150	27,359	140,340	257,732	**398,072**	358,418	+11
Conn.	11,725	29,602	43,638	81,685	192,128	371,616	54,556	114,663	150,205	299,164	25,651	475,250	784,720	**1,259,970**	1,152,368	+ 9
1955	**50,975**	**138,380**	**219,803**	**206,717**	**1,613,599**	**1,186,695**	**408,426**	**555,951**	**359,976**	**697,440**	**171,643**	**1,242,789**	**3,810,665**	**5,053,454**		+29
1954	58,114	141,363	227,881	205,723	745,072	1,117,912	403,069	547,766	237,860	617,950	167,305	1,036,845	2,885,404		3,922,249	
% Change	−12	−2	−4	+0.4	+117	+6	+1	+1	+51	+13	+3	+20	+32	**+29**		
MIDDLE ATLANTIC																
N. Y.	223,434	339,591	494,644	405,839	935,642	2,773,038	1,519,575	459,062	516,922	1,995,912	196,672	2,716,101	6,685,168	**9,401,269**	8,113,446	+16
N. J.	114,780	39,758	134,544	56,254	1,257,802	437,819	278,609	113,772	386,339	507,305	97,075	990,719	2,319,566	**3,310,285**	2,224,510	+49
Pa.	58,592	150,960	145,031	291,375	727,195	829,641	402,013	122,335	729,019	977,442	233,605	1,944,115	2,600,758	**4,544,873**	4,198,429	+ 8
Md.	42,464	23,690	2,968	60,440	368,662	301,164	165,010	235,774	152,387	204,168	83,859	440,414	964,398	**1,404,812**	1,521,724	− 8
D. C.	6,251	5,479	58,296	2,200	9,350	378,295	43,904	326,932	1,499	272,149	992	274,640	503,774	**778,414**	705,321	+10
Del.	2,135	10,718	17,423	46,959	39,824	61,289	16,662	67,282	21,445	98,319	35,692	155,456	195,010	**350,466**	407,831	−14
1955	**447,656**	**570,196**	**852,905**	**863,067**	**3,338,475**	**4,781,246**	**2,425,773**	**1,625,157**	**1,807,611**	**4,055,295**	**647,895**	**6,521,445**	**13,268,674**	**19,790,119**		+15
1954	415,918	593,659	513,508	905,299	2,333,087	4,298,995	2,244,483	1,555,997	1,652,818	3,583,744	629,750	5,870,687	11,300,574		17,171,261	
% Change	+8	−4	+66	−5	+43	+11	+8	+4	+9	+13	+3	+11	+17	**+15**		
SOUTH																
Va.	12,240	68,131	35,277	102,428	243,796	355,433	126,406	297,824	207,844	236,220	118,129	562,193	943,711	**1,505,904**	1,289,313	+17
W. Va.	3,065	44,685	1,504	33,257	35,032	91,110	44,247	64,326	307,586	15,486	20,134	343,381	252,725	**596,106**	418,315	+43
N. C.	24,913	35,097	10,261	204,973	30,653	210,603	60,571	317,500	212,733	93,169	105,349	411,529	576,793	**988,322**	961,234	+ 3
S. C.	26,452	15,138	9,817	150,685	17,781	106,241	115,824	253,742	207,264	78,780	48,807	334,851	441,938	**776,789**	681,607	+14
Ga.	20,358	29,611	22,281	111,100	53,188	239,070	54,316	180,336	107,631	80,516	87,276	276,173	529,174	**805,347**	710,281	+13
Fla.	9,522	52,939	78,802	44,533	389,358	194,136	140,443	163,446	153,885	201,830	85,070	441,335	909,183	**1,350,518**	1,342,277	+ 1
Ala.	28,561	27,235	10,289	114,901	32,455	253,521	52,209	224,716	483,092	75,509	218,393	776,994	519,171	**1,296,165**	822,684	+58
Miss.	10,987	6,824	40,044	23,903	7,597	58,402	35,613	50,412	86,262	36,463	272,491	397,156	181,430	**578,586**	501,377	+15
La.	19,097	23,581	66,739	85,185	104,504	124,199	95,675	155,122	413,561	66,607	425,191	906,038	518,301	**1,424,339**	1,271,167	+12
Ky.	13,519	46,385	13,259	44,370	18,408	123,959	18,440	99,901	326,152	89,623	156,765	572,540	278,340	**850,880**	704,323	+21
Tenn.	13,648	46,722	33,357	82,997	27,303	381,601	91,198	238,493	205,121	219,553	170,152	594,919	676,733	**1,271,652**	1,179,019	+ 8
1955	**182,362**	**396,348**	**321,630**	**998,332**	**960,075**	**2,138,275**	**834,942**	**2,045,818**	**2,711,131**	**1,193,756**	**1,707,757**	**5,617,109**	**5,827,499**	**11,444,608**		+16
1954	174,288	407,497	308,766	805,541	851,523	2,047,120	752,708	1,856,946	1,897,527	1,134,487	1,502,140	4,538,049	5,343,548		9,881,597	
% Change	+5	−3	+4	+24	+13	+4	+11	+10	+43	+5	+14	+24	+9	**+16**		
MIDDLE WEST																
Ohio	114,363	303,324	118,558	94,426	809,685	849,074	227,453	222,048	1,179,087	1,062,841	456,948	2,712,592	2,503,167	**5,215,759**	4,312,279	+21
Ind.	18,715	66,308	79,474	72,192	456,634	267,169	55,289	82,450	1,018,680	213,644	129,473	1,362,237	1,015,341	**2,377,578**	2,187,282	+ 9
Ill.	123,555	156,410	138,280	230,295	907,350	601,198	242,969	216,892	797,462	701,559	223,072	1,732,805	2,389,345	**4,122,150**	3,849,440	+ 7
Wisc.	17,022	34,750	45,786	48,578	123,551	196,687	39,075	65,420	208,510	200,937	62,309	471,956	505,249	**977,205**	820,744	+19
Mich.	128,561	228,237	209,128	99,941	936,421	925,799	132,689	219,122	452,373	547,134	194,510	1,194,017	2,660,776	**3,854,793**	2,920,790	+32
1955	**402,216**	**789,029**	**591,226**	**545,432**	**3,233,641**	**2,839,927**	**697,475**	**805,932**	**3,656,112**	**2,726,115**	**1,066,312**	**7,473,607**	**9,073,878**	**16,547,485**		+17
1954	311,820	766,075	548,473	528,947	2,737,022	2,631,787	611,457	744,941	2,833,333	2,076,256	1,045,365	5,978,372	8,112,163		14,090,535	
% Change	+29	+3	+8	+3	+18	+8	+14	+8	+29	+31	+2	+25	+12	**+17**		
WEST OF MISSISSIPPI																
Minn.	21,328	42,578	24,826	9,534	15,406	187,584	68,998	17,401	113,837	157,382	121,037	394,103	368,407	**762,510**	620,277	+23
Iowa	5,647	17,944	6,467	65,354	186,773	87,668	7,305	59,798	283,032	58,082	168,215	510,509	375,978	**886,487**	401,056	+121
Mo.	29,502	87,374	55,680	204,081	338,028	412,693	88,064	354,090	894,643	377,082	298,529	1,572,803	1,212,873	**2,785,676**	2,630,608	+ 6
Ark.	19,812	24,727	27,653	283,533	55,915	102,513	49,548	302,169	446,579	68,261	205,905	720,960	563,486	**1,284,446**	1,108,743	+16
N. D.	6,217	2,763	143	154,418		23,095	25,835	172,314	12,112	14,460	46,601	73,173	212,471	**285,644**	240,119	+19
S. D.	3,359	1,936	480	124,421	4,332	19,103	6,745	123,435	4,115	9,050	40,764	53,929	160,376	**214,305**	222,232	− 4
Neb.	4,918	34,172	15,405	138,607	16,314	183,677	43,861	174,946	69,080	66,037	90,461	227,031	435,501	**662,532**	668,507	+ 9
Kan.	20,066	66,151	9,998	212,525	72,916	168,592	49,413	305,685	107,510	67,244	236,261	411,015	599,661	**1,010,676**	1,294,520	−22
Okla.	61,847	34,109	15,495	273,949	41,595	151,166	140,151	365,538	144,662	91,553	183,473	420,177	717,823	**1,138,000**	1,012,486	+12
Tex.	326,589	246,441	132,607	1,022,274	182,894	1,274,962	837,777	1,243,430	2,283,680	2,303,476	1,502,336	6,104,340	4,008,696	**10,113,036**	9,430,750	+ 7
Mont.	7,591	4,071	67,479	320,299	10,675	54,373	14,584	323,761	31,426	15,611	15,724	62,761	479,072	**541,833**	608,026	−11
Wyo.	6,042	3,558	2,072	181,976	75	26,559	11,674	195,547	42,262	14,298	79,378	135,938	231,956	**367,894**	365,093	+ 1
Colo.	136,999	16,864	13,318	321,572	104,484	162,475	180,566	529,638	56,199	238,811	185,773	480,783	936,278	**1,417,061**	1,164,825	+22
N. M.	2,213	5,005	1,497	44,875	2,177	82,320	57,632	126,313	94,480	31,506	182,014	308,050	195,669	**503,719**	484,301	+ 4
1955	**652,130**	**587,693**	**373,120**	**3,357,418**	**1,031,584**	**2,936,780**	**1,582,153**	**4,294,065**	**4,583,617**	**3,512,853**	**3,356,471**	**11,475,572**	**10,498,247**	**21,973,819**		+ 9
1954	521,933	549,227	361,939	3,359,697	862,443	2,743,075	1,478,725	4,299,422	4,237,196	2,869,898	3,208,210	10,348,255	9,844,088		20,192,343	
% Change	+25	+7	+3	−0.1	+20	+7	+7	−0.1	+8	+22	+5	+11	+7	**+9**		
FAR WEST																
Idaho	3,300	8,561	7,341	111,555	24,590	62,187	20,320	141,137	26,228	11,959	555,479	593,666	237,854	**831,520**	786,795	+ 6
Utah	21,234	29,032	4,027	122,913	15,995	55,564	16,216	129,599	40,410	68,948	133,372	242,730	264,981	**507,711**	500,353	+ 1
Ariz.	4,842	5,539		574,447	28,666	44,909	78,203	647,544	74,602	91,472	170,485	336,559	736,606	**1,073,165**	971,571	+10
Nev.	8,918	2,287	4,374	35,904		27,772	13,338	22,421	18,602	66,669	44,790	130,061	92,593	**222,654**	176,229	+26
Wash.	97,452	61,499	210,929	1,687,059	456,297	651,807	273,361	1,303,548	215,678	337,280	258,814	812,412	3,437,764	**4,250,176**	3,546,972	+20
Ore.	5,581	13,101	41,026	194,403	26,904	77,814	21,937	221,135	137,783	70,146	241,600	449,529	380,766	**830,295**	743,870	+12
Calif.	113,540	386,436	134,005	2,595,580	583,263	1,602,078	873,626	948,412	670,413	2,934,989	634,485	4,240,760	6,287,655	**10,528,415**	7,717,922	+36
1955	**254,867**	**506,455**	**401,702**	**5,321,861**	**1,135,715**	**2,522,131**	**1,297,001**	**3,413,796**	**1,183,716**	**3,581,463**	**2,039,025**	**6,805,717**	**11,438,219**	**18,243,936**		+26
1954	165,051	457,991	381,854	3,528,859	1,069,358	2,272,287	1,186,340	3,355,859	881,524	2,664,416	1,836,032	5,384,785	9,058,927		14,443,712	
% Change	+54	+11	+5	+51	+6	+11	+9	+2	+34	+34	+11	+26	+26	**+26**		
CANADA																
1955	**192,936**	**249,744**	**188,491**	**829,002**	**1,384,020**	**1,692,757**	**1,338,033**	**858,562**	**2,172,632**	**2,319,886**	**1,682,850**	**6,176,942**	**5,873,408**	**12,050,350**		+ 9
1954	197,218	233,067	167,173	871,280	1,450,221	1,663,285	1,295,346	876,288	1,653,467	1,852,412	1,654,480	5,161,933	5,876,016		11,037,949	
% Change	−2	+7	+13	−5	−5	+2	+3	−2	+31	+25	+2	+20	−0.04	**+9**		

Shipments of Construction Materials Spurred By Record Construction Contracts in 1955

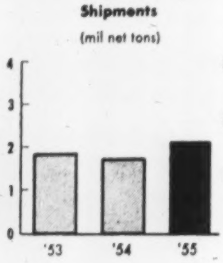
Steel

Fabricated Structural

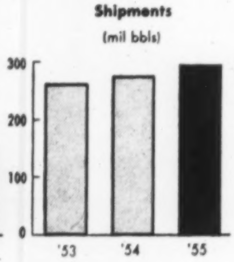


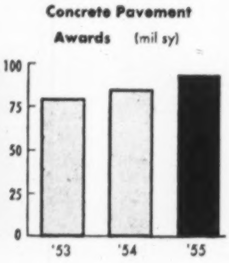


Reinforcing Bars

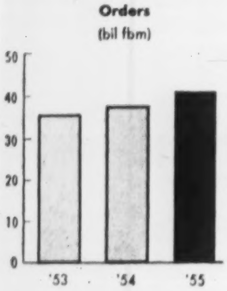


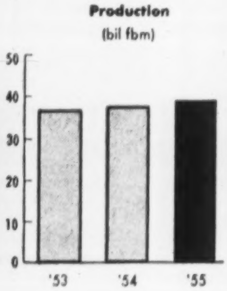
Portland Cement

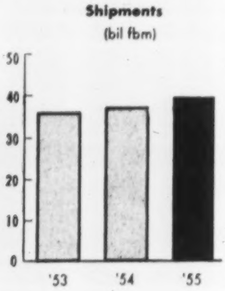




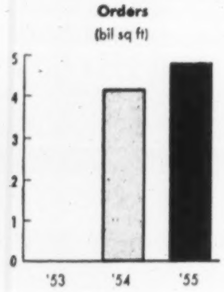
Lumber

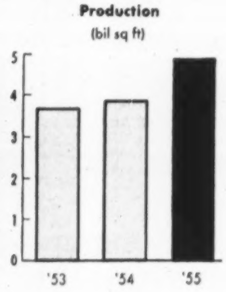




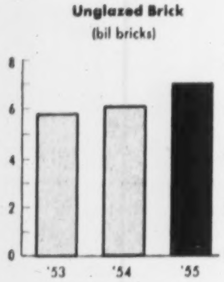


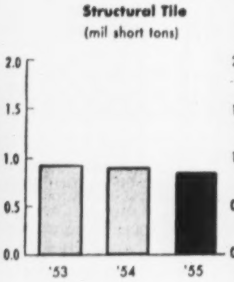
Douglas Fir Plywood

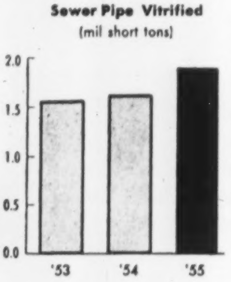




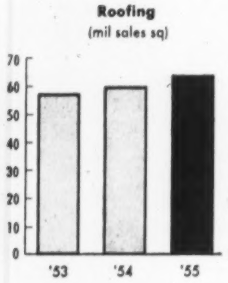
Clay Products Shipments

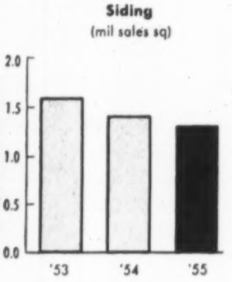




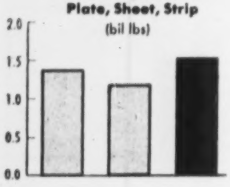


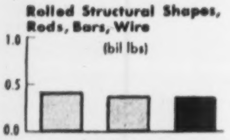
Asphalt Products Shipments

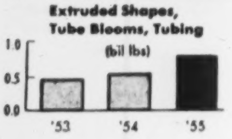




Wrought Aluminum Shipments







Construction Materials Shipments

Material	Source	Unit	1953	1954	1955	Percent change '54–'55
Steel						
Fabricated structural bookings	AISC	thous tons	2,786.6	2,509.8	3,695.5	+47
Fabricated structural shipments	AISC	thous tons	3,117.7	3,135.5	2,982.3	− 5
Reinforcing bars (net)	AISC	thous tons	1,848.9	1,751.0	2,164.6	+24
Cement, Portland						
Shipments	Bureau Mines	mil bbls	260.9	274.1	295.0*	+ 8
Concrete pavement awards	PCA	mil sy	78.6	85.3	92.8	+ 9
Lumber						
Orders	NLMA	mil fbm	35,612.0	37,354.0	39,744.0	+ 6
Production	NLMA	mil fbm	36,742.0	37,329.0	39,105.0	+ 5
Shipments	NLMA	mil fbm	35,954.0	37,038.0	39,605.0	+ 7
Plywood, Douglas fir						
Orders (3/8 in. basis)	DFPA	mil sq ft	na	4,108.0	4,817.0	+17
Production (3/8 in. basis)	DFPA	mil sq ft	3,670.4	3,903.8	4,900.2	+28
Clay construction products						
Brick, unglazed, common and face	Bureau Census	mil std bricks	5,771.2	6,119.4	7,025.0*	+15
Structural tile, unglazed	Bureau Census	thous short tons	922.0	895.3	835.0*	− 7
Vitrified clay sewer pipe	Bureau Census	thous short tons	1,563.0	1,636.5	1,890.0*	+15
Aluminum wrought products (net)						
Plate, sheet, strip	Bureau Census	mil lbs	1,368.2	1,165.1	1,540.0*	+32
Rolled structural shapes, rod, bar and wire	Bureau Census	mil lbs	422.0	361.3	365.0*	+ 1
Extruded shapes, tube blooms, and tubing	Bureau Census	mil lbs	451.9	513.3	790.0*	+54
Asphalt products						
Roofing	Bureau Census	thous sales sqs	56,702.7	59,132.3	63,700.0*	+ 8
Siding	Bureau Census	thous sales sqs	1,556.6	1,427.8	1,300.0*	− 9

* Estimated

Supply and Delivery Picture for Key Materials in 22 Cities in January

Key: Supplies— Sh = shortage A = Adequate P = Plentiful
Deliveries— N = Normal Sl = Slower than normal I = Immediate Delivery time shown in days

	Atlanta		Baltimore		Birmingham		Boston		Chicago		Cincinnati		Cleveland		Dallas		Denver		Detroit		Kansas City	
Material	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv
Cement, Portland	A	2-3	A	4-5	P	1	P	1-6	A	...	A	2	A	1-2	A	1	A	I	A	N	Sh	7
Structural shapes	...	28	A-Sh	30-60	Sh	90	...	...	Sh	90-120	Sh	7-10	A	30	Sh	360-540	Sh	90	Sh	60	P	2
Reinforcing bars	...	90-180	A-Sh	30-60	Sh	90	A	1-2	A	weeks	A	30-45	A	30	A	7	Sh	90	Sh	N	P	2
Sheetpiling steel	...	120-125	...	...	...	...	P	..	Sh	90-120	A	21-30	Sh	To 180	Sh	60	Sh	180-240	Sh	180-240	...	...
Copper water tubing	A	14-21	A	I	A	I	P	1-3	A	To 28	A	2-14	A	7-10	P	7	Sh	60-90	Sh-A	2-3	A	10
Centrifugal cast iron pipe	...	90-180	A	7-10	...	...	Sh	30	...	...	...	...	...	...	P	7	...	...	...	...	A	30-45
Stainless steel sheets, flat	...	...	A	3-5	A	90	A	7	A	weeks	P	1-3	A	3-7	A	10	Sh	90	Sh	90-100	Sh	90
Aluminum sheets, flat	...	...	A	3-4	A	30-60	Sh	98	Sh	weeks	P	5-10	A	7-10	A	10	Sh	90	Sh	90-120	Sh	90
Douglas fir	...	...	A	2-3	A	21-28	Sh	7-14	Sh	14-21	A	15-20	A	...	...	...	Sh	30-45	A	N	P	30
Southern pine	Sh	28	A	2-3	A	14	P	2	A	14-21	A	8-10	A	...	P	14	...	...	A	N	P	30
Plywood, Douglas fir	A	I	A	7	A	21-28	Sh	...	Sh-A	21	A	30	A	...	P	30	...	...	...	...	P	30
Vitrified clay sewer pipe	A	30-60	A	3-4	Sh	60	P	1-2	A	I	A	3-4	A	3-4	P	7	A	150	Sh	21-28	Sh	mos
Concrete sewer pipe	A	I	P	1-2	A	90	P	1-2	A	I	A	5-10	A	3-4	P	7	P	I	A	N	P	2
Structural clay tile	Sh	60	A	5-7	Sh	30-60	P	2	A	2	P	7	A	2-3	P	10	...	...	P	7	A	3-4
Brick	A	I	P	1-2	Sh	30-60	P	2	A	1-2	P	7	A	2-3	P	10	Sh	90	A	2	A	3-4
Mineral wool insulation	A	I	A	3	P	14	Sh	14-21	A	14-21	A	30	P	2	P	1-14	A	60-90	A	4-5	A	14-28
Glass fiber insulation	A	I	A	3	A	21	Sh	14-80	A	14-21	A	30	A	21	P	1-14	A	1-30	P	30	Sh	28-42
Gypsum lath	Sh	7-14	Sh	30-60	Sh	30	Sh	21-28	A	To 14	P	3-5	Sh	28	P	1-14	Sh	42-56	Sh	Indef	P	14-28
Gypsum sheathing	Sh	7-14	Sh	30-60	Sh	30	Sh	21-28	A	To 21	A	30	Sh	28	P	1-14	Sh	42-56	Sh	Indef	P	14-28
Window glass	Sh	42-112	A	2-4	Sh	30	Sh	14-42	...	...	Sh	Indef	...	...	...	...	Sh	Indef	Sh	60-90	Sh	Indef

	Los Angeles		Minneapolis		New Orleans		New York		Philadelphia		Pittsburgh		St. Louis		San Francisco		Seattle		Montreal		Toronto	
Material	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv	Sup	Deliv
Cement, Portland	A	N	P	I	A	Sl	P	N	ASh	3-4	P	3-5	A	1-3	A	N	P	2	A	2	P	I
Structural shapes	P	1-5	Sh	3	...	...	Sh	N	Sh	90+	Sh	60	A	1-2	A	30	A	60	Sh	90	Sh	To 180
Reinforcing bars	P	1-5	A	14-20	Sh	Sl	A	56	Sh	90+	Sh	90	A	1-2	P	15	A	30-60	Sh	90	Sh	42
Sheetpiling steel	Sh	...	Sh	...	...	...	...	...	A	I	Sh	90	...	...	P	15-30	...	...	A	30	Sh	To 273
Copper water tubing	P	N	Sh	14-28	Sh	Sl	P	N	Sh	21-28	A	5-7	A	2-3	P	I	A	30	Sh	30	A	1-2
Centrifugal cast iron pipe	P	N	...	...	...	...	...	...	P	I	Sh	42-56	A	28-42	ASh	30-45	P	21-35	P	7	A	7
Stainless steel sheets, flat	P	N	A	Sl	Sh	Sl	Sh	98	ASh	14+	A	21	A	3-10	ASh	60	A	35-63	Sh	30	A	98
Aluminum sheets, flat	P	N	A	N	Sh	Sl	A	21-28	P	I	P	5-7	A	3-10+	A	30	A	90	Sh	30	Sh	Sl
Douglas fir	P	I	Sh	30	Sh	Sl	ASh	90	A	To 45	Sh	30	A	1-3	Sh	30-45	Sh	30-45	P	3-7	Sh	14-45
Southern pine	...	...	Sh	30	Sh	Sl	A	21-28	A	To 45	P	5	A	1-3	...	...	...	...	P	3-7	Sh	14-45
Plywood, Douglas fir	P	I	A	N	...	...	ASh	42-56	A	N	Sh	30	...	14+	P	21	A	7-21	P	7	Sh	1-2
Vitrified clay sewer pipe	P	N	A	N	A	90-120	...	...	P	I	A	14-21	A	1-3	A	30	A	60-90	A	14	A	1-4
Concrete sewer pipe	P	N	Sh	N	A	N	...	...	P	I	A	14-21	A	1-2	P	7	P	I	P	2	A	7
Structural clay tile	...	...	P	N	Sh	Sl	A	N	P	I	P	10	A	7-10	P	3	A	I	A	7	P	1-2
Brick	P	N	P	N	Sh	Sl	P	N	P	I	P	5	N	1-3	P	3	P	I	A	30	A	7
Mineral wool insulation	P	I	A	14-21	A	N	P	...	P	I	P	3-5	A	3-5	P	14	P	2	P	7	A	1
Glass fiber insulation	P	N	A	14-21	...	...	Sh	...	P	I	P	3-5	A	20	P	14	A	30	P	7	A	1
Gypsum lath	P	N	Sh	Indef	A	N	A	N	A	N-Sl	A	7-10	A	3-7	A	10	P	2	P	4	A	1
Gypsum sheathing	P	N	A	14-21	A	N	A	N	A	N-Sl	A	7-10	A	3-7	A	10	P	2	P	4	A	1
Window glass	P	N	Sh	60-90	...	...	Sh	28+	Sh	Sl	P	10	...	21+	Sh	90	Sh	120	A	7	Sh	21-28

Shortages and slow deliveries of key construction materials are already in evidence though it will be months before construction hits full stride. Contractors ordering materials well in advance, getting commitments farther ahead than last year, will fare best in the scramble shaping up ahead.

Major critical materials are steel, glass, Douglas fir, plywood, and aluminum building sheets. Other items are less of a problem now, but cement, copper water tubing, vitrified sewer pipe, and Southern pine could become critical later on.

The fact that there are shortages now, when construction activity has slackened off for the winter, means that some manufacturers and distributors are not building up supplies for the spring and summer demand. Others are still working off backlogs of last year.

Glass is currently the most widespread problem. Deliveries to Seattle are taking as long as four months. Steel continues to be tight as in '55, with structurals, reinforcing bars, and sheet piling short in several cities. Other metal products used in construction are short in scattered areas. Aluminum building sheets are a problem in 13 of the 22 cities in ENR's January check. Stainless steel is in short supply because of the tightness of nickel. Unless the government releases supplies from its stockpile, stainless steel may become even harder to get.

Douglas fir lumber and plywood supplies are short and deliveries slow in several cities. The December floods in the Northwest have caused serious disruptions of production and transportation. Heavy rains preceding the floods kept loggers out of the woods, thus cutting mill receipts. At the moment, Douglas fir is short in 10 cities, Southern pine in four cities, plywood in five cities.

Cement is in reasonably good supply at this time, though this is largely due to the seasonal let-down in construction activity. Clay sewer pipe is very short in Kansas City, where deliveries are taking months.

Gypsum products are short in eight centers. Demand has been so phenomenal in the last few years that new producers are contemplating entering the field, among them Johns-Manville Corp. and Allied Chemical & Dye Corp.

MONARCH WHYTE STRAND is available in the right size and type for today's faster, higher output construction equipment.

When you work wire rope like this MONARCH WHYTE STRAND pays off in service!

PREformed MONARCH WHYTE STRAND meets the needs of your equipment—with flexibility, strength, and abrasion resistance!

There's no guesswork involved in getting the rope you need for scrapers, draglines, shovels or any other equipment. Any Macwhyte distributor can supply your needs from a thousand and one types and sizes of MONARCH WHYTE STRAND. These are supplied Internally Lubricated and PREformed, in Lang Lay or Regular Lay, with Independent Wire Rope Core or Fiber Core.

There are correct MONARCH WHYTE STRAND Wire Ropes for all equipment. Give this rope an opportunity to serve you—you will be more than pleased with its performance.

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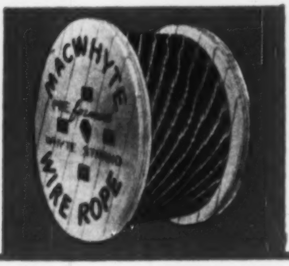

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10990

Heavy Equipment Stocks and Deliveries in February

Key—Deliveries: S = Slower than normal N = Normal I = Immediate Delivery time shown in weeks
Stocks: S = Shortage N = Normal A = Adequate

City	Atlanta		Baltimore		Birmingham		Boston		Chicago		Cincinnati		Cleveland		Dallas		Denver		Detroit		Kansas City	
Type of Equipment	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del
Tractor, diesel	A	N 2	N	N 2-4	S	N 4-16	A-S	N-S	A-S	S 4	A	N 3-4	A	N 2-3	A	N 6	N	N	A-S	S 3-4	A	N
Tractor with cable scraper	A	N 2	N	N 2-4	S	N 4-16	S	S	A-S	S 4	A	N 4	A	N 10	A	N 6	N	N	A-S	S 3-4	A	N
Scraper without power unit	A	N 2	N	N 2-4	S	N 4-16	A	N	S	S 2-4	S	N 4	A	N 10	A	N 6	N	N	A-S	S 3-4	A	N
Crane, crawler	A	N 2	A-N	N 3-6	S	N 4-16	S	S	N	N	N	N 4	A	N 2-12	A	N 3-26	N	N	A-S	S 3-4	A	N
Crane, truck mounted	A	N 2	A-N	N 3-8	S	N 4-16	S	S	N	N	N	N 4-8	A	N 8	A	N 6	S	N	A-S	S 3-4	A	N
Power shovel, crawler	A	N 2	A-N	N 3-4	S	N 4-16	A-S	S	N	N	N	N 4	A	N 8	A	N 6	S	N	A-S	S 3-4	A	N
Dragline, crawler	A	N 2	A-N	N 3-4	S	N 4-16	A	I	N	N	A	N 4	A	N 6	A	N 6	S	N	A-S	S 3-4	A	N
Motor grader	A	N 2	A	N 1	S	N 4-16	A	I	A	N-I	A	N 1-2	A	N 2-3	A	N 2	S	N	A-S	S 3-4	A	N
Truck, off-highway	A	N 2			A	N 4	N	S 12-24	S	S 2-4	S	S 12-26	A	N 2-3	A	N 6	S	N	A-S	S 3-4	A	N

City	Los Angeles		Minneapolis		New York		Philadelphia		Pittsburgh		St. Louis		San Francisco		Seattle		Montreal		Toronto	
Type of Equipment	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del	Stk	Del
Tractor, diesel	S*	S 2	S	S 12	A-N	N-S 8-12	N	S to 16	A	S 18	S	N 4-17	A	S 90	A	S 4-8	A	N 3	S	S to 12
Tractor with cable scraper	S*	S 2	A	S 12	A-N	S 4-12	N	S to 16	N	♯	A-S	N-S 8-12	A	S 90	A	S 4-8	A	N 3	S	S to 16
Scraper without power unit	S*	S 2	A	I	A-N	N-S 2-8	N	N 4-8	N	S 12	A	N 2-4	A	S 90	A	N 2-3	A	N 3	A	N 1-2
Crane, crawler	S*	S 2	S	N 2-4	N†	N-S 1-8	S	S 12-36	A	S 8	A	N 5-12	S†	S† 24-32	S	S 8-16	A	N 10	A-S	N-S to 24
Crane, truck mounted	S*	S 2	S-N	N 3	N†	N-S 2-8	A	N 8-12	A	S 8	A	N 5-12	S†	S† 24-32	S	S 12-16	A	N 10	S	S to 12
Power shovel, crawler	A	S 2	S	N	N†	N-S 1-32	S	S 12-36	A	S 8	A	N 5-12	S†	S† 24-32	S	S 12-16	A	N 3	A-S	N-S to 26
Dragline, crawler	A	S 2	A-N	N 4	N	S 6-12	S	S 12-36	A	S 8	A	N 5-12	S†	S† 24-32	S	S 12-16	A	N 2	A-S	N-S to 26
Motor grader	A	S 2	S	S 8	N†	S† 18	A	S to 12	A	S 8	A	N 1-8	A	S 12	S	S 12-16	A	N 3	A	S to 16
Truck, off-highway	A	N	A	S	A	N 12	A	N 4-8	A	N	S	S to 16	N	S 8-12	N	S 16	A	N 3	A	S to 12

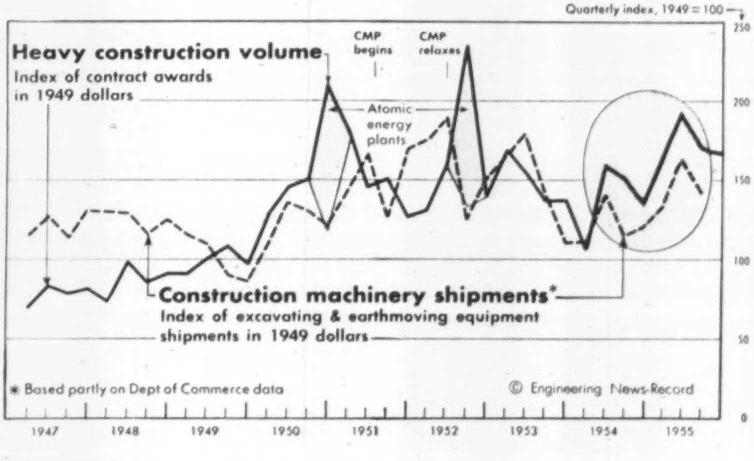
* Shortages not serious ♯ Cannot order † Large size

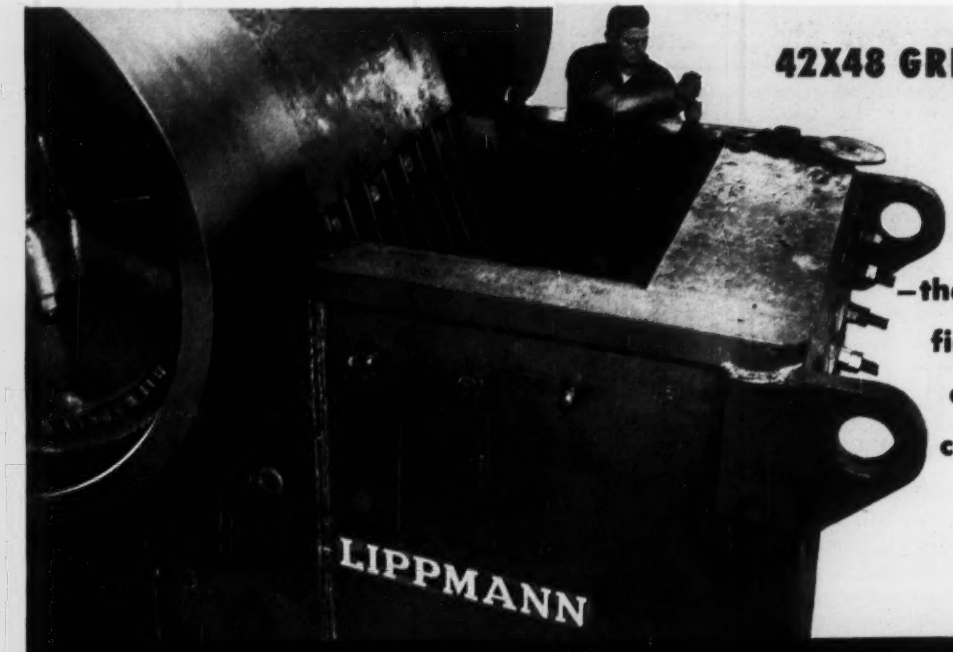
As contractors took on a record volume of new construction awards in '55 they rushed to distributors with orders for new excavating and earthmoving equipment. The sharp upswing in orders caught manufacturers and distributors for the most part unprepared. Though the sales lag during the first half of '54 gave way to an upturn late in the year, the big increase in '55 sales was unexpected.

Deliveries began to stretch out in the first quarter of '55 and although shipments turned sharply upward (setting a third quarter record) there are still reports of slow deliveries and short stocks of equipment in several cities. This month, for instance, distributors in more than one-half of 21 cities checked stated that deliveries were slower than normal and stocks short for some types of heavy equipment (see table above).

A few manufacturers are currently allocating shipments of tractors and tractors with scrapers.

- **Seattle** reports that deliveries are slower than normal for all types of equipment listed above except scrapers without power units. Delivery times range from 1-2 months on diesel crawler tractors and tractors with scrapers to 3-4 months for crawler and truck cranes, draglines, motor graders, heavy duty-off-highway type trucks.
- **San Francisco** notes slow deliveries on all types except cranes, shovels, and draglines of less than two cu yd capacity which are available in thirty days. Crawler crane deliveries are very slow—running six to eight months. Sales of cranes, shovels and draglines were exceptionally high in December and January. Bucyrus-Erie for instance, says its volume was about double a year ago.
- **Los Angeles** distributors say deliveries are a little slower than normal, though stocks of some types of equipment are short, this isn't considered serious at the present time.
- **Denver** dealer stocks are low for some types of equipment, particularly rubber-tired. Deliveries from manufacturers are slow but contractors are getting normal deliveries out of distributor stocks.
- **Minneapolis** notes slower deliveries for crawler tractors, tractors with cable scrapers, motor graders and heavy duty trucks. Deliveries are running about three months on all of these types except trucks. Though stocks of trucks are considered adequate for now, a shortage is probable in three to four months.
- **St. Louis** distributor expect to take care of spring and summer orders on a normal delivery basis. Some tractors with scrapers and heavy duty trucks are coming through slower from manufacturers—truck deliveries taking up to four months. Some types of tractors, tractors with scrapers and trucks are being allocated. However, deliveries are currently improving.
- **Cincinnati** truck distributors report very heavy order backlogs and deliveries taking three to four months. Though weather held sales down in December and January, most dealers expect other types of equipment to top 1954 and 1955 sales figures in '56.
- **Pittsburgh** reports deliveries slower for all types of heavy equipment except heavy duty trucks. Tightest item is tractor with cable scraper which cannot be ordered. About half of the distributors checked say shipments of some items are on allocation. But dealer stocks appear adequate at this time except for scrapers without power unit. Listed above except trucks.
- **Philadelphia** reports tractors with rubber tired scrapers are very short with deliveries extended to three months or more and some makes on allocation. Crawler cranes are in short supply and deliveries run from three to nine months. Crawler tractors stocks are normal with some exceptions but deliveries are slow.
- **Other cities** reporting slow deliveries are New York, Boston and Detroit. In Detroit, distributors with active sales organizations have worked their stocks down to short to slightly short and they note deliveries are slowing down. Less aggressive dealers have adequate stocks and normal deliveries.





42X48 GRIZZLY-KING

—the largest and finest overhead eccentric jaw crushers made.

GRIZZLY-KING superiority

You just can't appreciate the superiority of a Grizzly-King overhead eccentric jaw crusher until you've seen one in action and talked to those who have them.

Owners will tell you about tremendous production capacity, continuous service records, low jaw-die replacement costs, freedom from servicing and adjustment, low power costs.

No wonder Lippmann Grizzly-Kings continue to dominate the giant size (30x42 to 42x48) as well as regular size (12x36 to 24x36) overhead eccentric jaw crusher fields. A Grizzly-King was the world's largest 8 years ago and a Grizzly-King is still the world's largest today — in size (dimension and weight), in output (up to 1200 tons per hour) and in maintenance savings (only lubrication in most instances).

That is why the country's largest producers of crushed stone set production and service records with these Lippmann giants . . . and why others are installing them *now.*

You can get Grizzly-King benefits only by using "Grizzly-Kings." And remember this . . . not one of these big Lippmann crushers — whether 42x48 or smaller — has ever failed or failed to satisfy. Learn about Grizzly-King's advantages by contacting your local Lippmann dealer or the factory direct, today. Lippmann Engineering Works, 4645 W. Mitchell St., Milwaukee 14, Wisconsin.

1100-56-1

Typical comments from Grizzly-King owners everywhere: —

"Wouldn't have any other crusher but a Lippmann"

"Crushed 1,200,000 tons without turning jaw dies . . . and they're still going strong"

"During the 5 months it has been in service, it has required no adjusting or servicing except for lubrication"

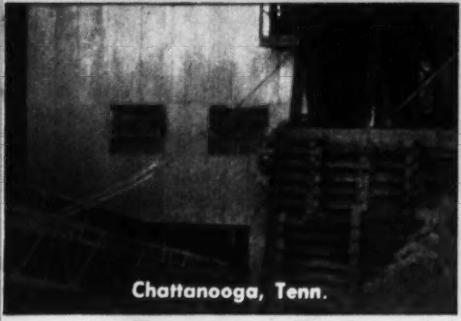
"Maintenance? Haven't even replaced a die-bolt"

"Haven't turned my Grizzly-King dies even after 2½ million tons"

These 42x48 GRIZZLY-KING crushers, the biggest overhead eccentric jaw crushers ever built, are already established as performance kings in output and low-cost operation.

Davidson, N. C.

Sandusky, Ohio


Chattanooga, Tenn.

Elizabethtown, Ky.

South Zanesville, Ohio

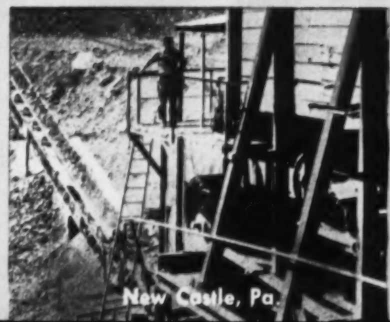
breaking rocks and records ...all over the world

These older installations of GRIZZLY-KING giants have been establishing themselves right along as production leaders in some of the biggest quarries.

Winston-Salem, N. C.

Byington, Ohio

Mitchell, Ohio

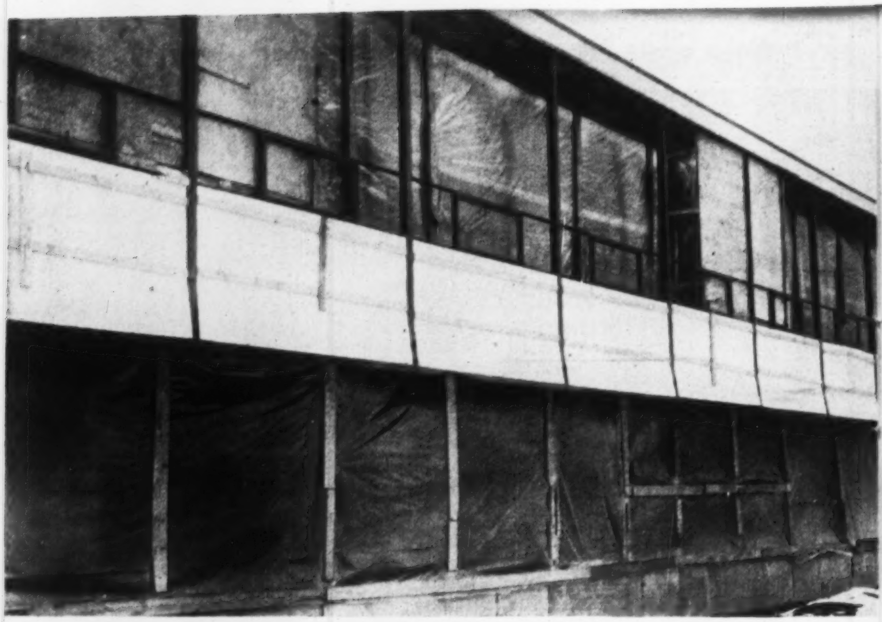

New Castle, Pa.

Bloomington, Ind.

LEW **LIPPMANN**

CRUSHERS FEEDERS SCREENS CONVEYORS CRUSHING & WASHING PLANTS

For this school addition nearly 5000 square feet of "Visqueen" film made of Bakelite Brand Polyethylene was laid over the conventional wooden scaffolding. Shielding against high winds, the film helped hold in heat from stoves, permitting brick to be laid even when snowing outside. On milder days, sunlight through the film produced so much heat, stoves were left off.



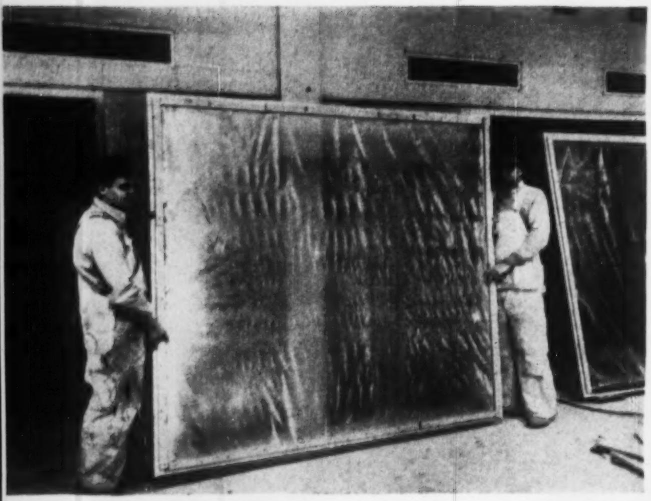
Sharon Center School, Sharon, Conn., Sherwood, Mills & Smith, Stamford, Conn., *Architects*
John C. Smith, Inc., New Canaan, Conn., *Contractor*

How to beat bad weather work stoppage with

Polyethylene Weather Shields

It is both easy and economical to keep work going on right through the coldest winter months. Tough, moisture-resistant film made of Bakelite Brand Polyethylene, covering building openings, protects materials and workmen against snow, rain, cold and high winds. And, in addition, translucent polyethylene weather shields tend to reduce construction lighting as well as heating costs.

It can be very profitable to you to investigate this and all the other construction uses of film made of Bakelite Polyethylene—such as moisture and vapor barriers under concrete slab foundations, covers for materials and equipment, shower liners, dust barriers. See your building supply dealer, or write Dept. NN-49.



As outer walls were completed, film removed from the scaffolding was stapled into large wooden frames. These were fastened into window frames to shield until time for glazing. The film is .004 inch thick, 13 ft. wide and supplied in 100 ft. rolls. This application was developed by **The Visking Corporation,** Terre Haute, Ind.

It pays to specify film made of

BAKELITE
BRAND
Polyethylene Plastic

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New Records for Material Shipments in 1955

Another banner year in construction activity put the pressure on material suppliers in 1955. Bookings generally piled up, while production and shipments lagged. New plants were put under contract in steel, cement, and aluminum to relieve the shortage. Some of these will come into production by mid-summer, others not until 1957. Hence the outlook is for some easing of the pinch this year, more next.

Steel

The tight situation in steel has been one of the most difficult for the construction industry. Many a project has been held up for want of steel supplies, while other projects have been postponed. This goes not only for buildings, but for roads and other heavy construction undertakings.

Take the fabricated structural steel picture. By the end of 1955, bookings had skyrocketed to nearly 3.7 million tons, a 47% jump over 1954. Yet, despite the valiant efforts of the steel industry toward the close of 1955 to jack up the outflow of material from mills, the year ended with shipments 5% behind those of the year before. In the current year, the industry expects to step up shipments by as much as 12%.

Whether it can do this is still problematical. Late in 1955, the widely forecast downward turn in automobile production gave some hope to the construction industry that a good flow of construction steel might be forthcoming in 1956. But since the beginning of 1956, the pressure on the steel industry has shown no let-up. Supplies are still tight; the motor cutback may be much less drastic than at first expected; even residential construction may equal that of 1955.

Pressure for steel is being stimulated by the prospect of more price increases in the offing. The recent revisions in "extras" have made consumers uneasy. Moveover, wage negotiations are coming up this summer which are sure to mean even greater price increases ahead, and maybe work stoppages, too.

As a result of plenty of business in hand plus the fear of delays ahead, construction consumers have rushed to the mills with orders. Many small and medium-size fabricators are said to be sold out for the rest of 1956. Pipe and tube mills are booked well into the current year, and for some sizes are booked into 1957. The steel bar situation is no better. Last year, reinforcing bar shipments were up 24% over 1954.

The steel industry is stepping up its capacity by inaugurating one of the biggest construction programs in history over the next three years. This will add 15 million tons to total capacity.

Bethlehem Steel, cognizant of the particularly tight situation for structural steel, will have its new structural capacity available by July, when its output will be at the monthly rate of 210,000 tons per month.

In addition to the anticipated increase in tonnage to be made available from such expansion programs, the fabricators look to customers, both public and private, to plan and schedule their projects more carefully so that fabricating schedules can be established most efficiently. At the moment, fabricators have a backlog of business totaling 2,000,000 tons, equivalent to eight months work. A year ago, the backlog meant a six-months job for the industry. However, much of the current business on the books is for 1957 delivery.

Cement

In cement the story is much the same—big bookings, production at or above capacity, and shipments 8% above the preceding year. But ENR's survey of the industry (Dec. 15, '55) forecast that capacity of the industry would be upped by 23,000,000 bbls by the close of 1955, with an additional 56,000,000 bbls being added in 1956. This will bring the industry's total capacity to the 368,000,000 bbl mark by the end of this year. An additional 15,000,000 bbls is scheduled for 1957. The huge cost of adding this new production capacity has already been reflected in higher cement prices.

Concrete pavement awards rose 9% in 1955, according to the Portland Cement Industry. The renewed impetus behind a large road building program should provide even greater demand for cement in the current year.

Lumber

The lumber industry came close to its all-time high production record of 40,000,000,000 fbm set back in 1916. At 39,105,000,000 fbm, up 5% from 1954, the industry almost equaled its order and shipment requirements. In the latter part of 1955, floods on the West Coast upset operating schedules. The industry anticipates that in the current year, lumber supplies and consumption will be in balance. The growth of new timber approximates that being cut for the first time in 60 years.

Plywood

Production of Douglas fir plywood was stepped up 28% in 1955 and surpassed orders by a slight margin. Nevertheless, supplies were not plentiful and some mills allocated production to their regional sales offices.

Complaints of "dumping" of hardwood plywood from Japan were voiced during the year but failed to get government support to curb the flow.

Clay Products

The boom in home construction in 1955 is most apparent in brick production and shipments. Shipments passed the 7 billion mark last year to set a new record, 15% above 1954.

Structural tile failed to participate in the construction boom last year. Shipments fell off 7% from the preceding year, marking the fifth consecutive year of declining shipments.

Vitrified clay sewer pipe shipments rose 15% in 1955 compared with 1954, reflecting the expansion of residential construction throughout the country. The year set both a new production and shipment record.

Aluminum Products

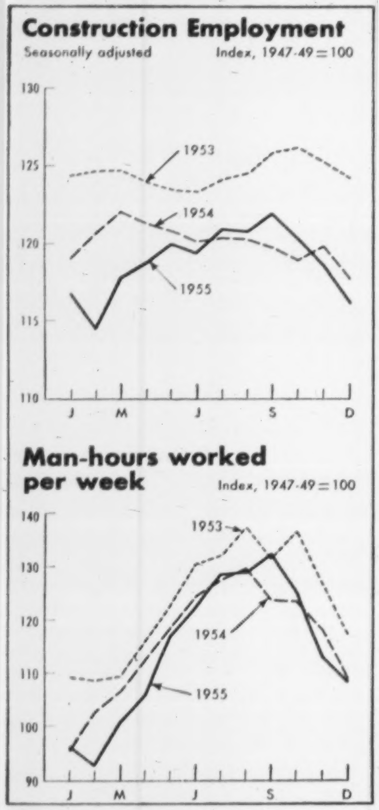
The construction industry has become the largest single customer of the aluminum industry. Last year, plate, sheet, and strip aluminum shipments zoomed 32% above the preceding year to set a new high of 1.5 billion pounds. Rolled structural shapes, rods, bar, and wire shipments were only slightly ahead of 1954, but below the previous high mark of 1952. But extruded shape shipments have jumped 54% ahead of 1954 to a new high and contributed to the industry's realization of the need for new capacity.

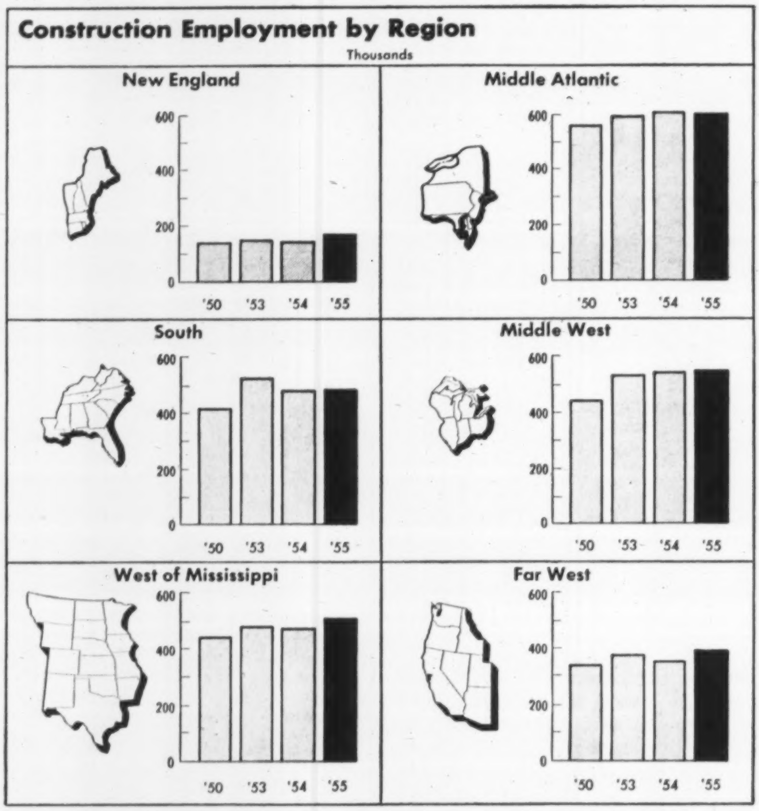
Fortunately, new aluminum capacity is fast being constructed and some of it will come into operation during 1956 to ease the pressure. New producers are coming into the field for the first time and are expected to add close to 700,000 tons of primary capacity by the end of 1958.

Asphalt Products

The big increase in building activity in 1955 stimulated the shipments of asphalt roofing but did little for asphalt siding. Roofing shipments expanded 8% over the previous year to 63.7 million sales squares. This set no new record, but is the best since 1950.

Asphalt siding shipments have been declining since 1946. Last year they slid 9% below the 1954 total to 1.3 million sales squares.





Employment Up in New England and West

Employment in the construction industry in 1955 increased a modest 4% to about 2,600,000, according to the joint estimates of the U.S. Departments of Labor and Commerce. This estimate gives a somewhat better picture of employment in the industry than currently published national figures. Month-to-month estimates, seasonally adjusted, put last year's employment above the preceding year in only the four months of July through October, the usual peak months of activity. By the close of 1955, employment had slipped about 1% under December, 1954 and 6% under December, 1953.

Special trades contractors maintained employment rolls somewhat better than general building contractors in 1955.

Man-hours worked per week was approximately the same in 1955 as in the preceding year, rising to a peak in September, 7% above 1954.

• New England—Employment in the New England states was one of the bright spots of 1955. Average employment in the region approximated 168,000, a 15% increase over 1954. At the peak of the year's activity in September, employment in Connecticut was running 18% ahead of the year before; Massachusetts was up 17%; Rhode Island, 10%; Maine, 2%.

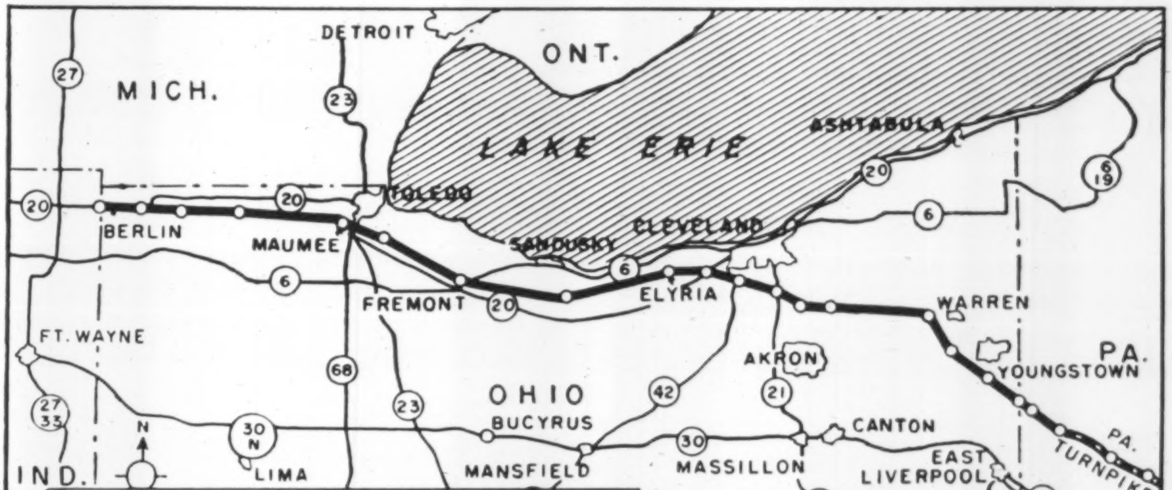
• Middle Atlantic—The Middle Atlantic states employed just about as many construction workers in 1955 as the preceding year, averaging 602,000. In New York, which employed nearly 253,000 construction workers in September, the gain over 1954 was only 1%. In Pennsylvania, with over 210,000, the gain was 10%; in New Jersey, with 107,000, the increase was 9%.

• South—The South also maintained an even keel with respect to construction employment last year, averaging 489,000. September employment was up 4% over 1954 in Florida and Virginia, 19% in West Virginia, 9% in Georgia and Mississippi, but under the preceding year in North and South Carolina by 3%, Alabama by 7%; Louisiana and Tennessee by 11%.

• Middle West—Employment in the Middle West gained some 6,000 to 544,000, the largest concentration of construction employment next to the Middle Atlantic region. Indiana reported the biggest increase (26%) in September compared with 1954 of any state in the country; Wisconsin reported a big 17% rise, Ohio 1%. Illinois, the fourth largest state in volume of construction employment with 175,000, was operating with 3% fewer employees at the September peak than the year before. Michigan was 7% behind the preceding year.

• West of Mississippi—This region, with a 6% increase in average employment in 1955 to 504,000, is the third biggest employer of construction labor. Texas, top state in the area in contract volume with more than $2 billion of awards in 1955, employed 164,000 in September, a 6% gain over the year before. Minnesota reported a sharp 16% rise, Nebraska 13%, Iowa and New Mexico 6%.

• Far West—Construction employment in the Far West region moved up a sharp 13% to 391,000 in 1955. California, the No. 1 state in the country with 290,000 construction workers, reported a 10% increase in September compared with the year previous. Utah was up by as much as 20%; Arizona and Oregon 9%; Nevada 6%.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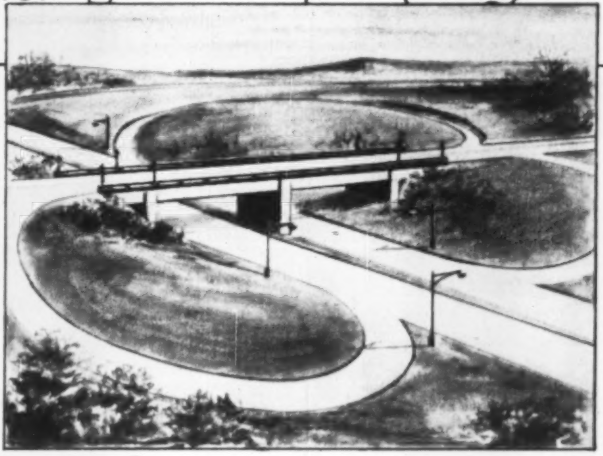

282 BRIDGES

IN 241 MILES

ON THE
OHIO TURNPIKE

...and McKiernan-Terry a popular choice for pile driving

The many bridges which carry intersecting highways over or under the Ohio Turnpike are quite similar in design. Of interest are the many instances in which unrelated contractors chose McKiernan-Terry Pile Hammers to drive the piles for the abutments and the piers all along the 241-mile length of the turnpike.

In the construction of turnpikes and thruways in New York, New Jersey, Pennsylvania, Indiana, New England and other sections of the country as well, McKiernan-Terry pile-driving equipment has helped contractors do their portions of the projects speedily and economically.

Write for bulletins on the extensive McKiernan-Terry line of single-acting and double-acting pile hammers, double-acting pile extractors, pile hammer leads and accessories.

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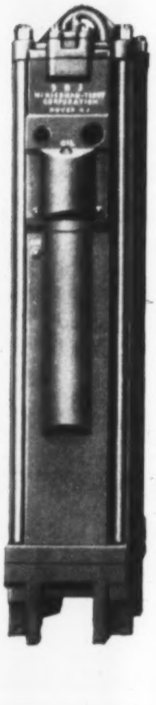
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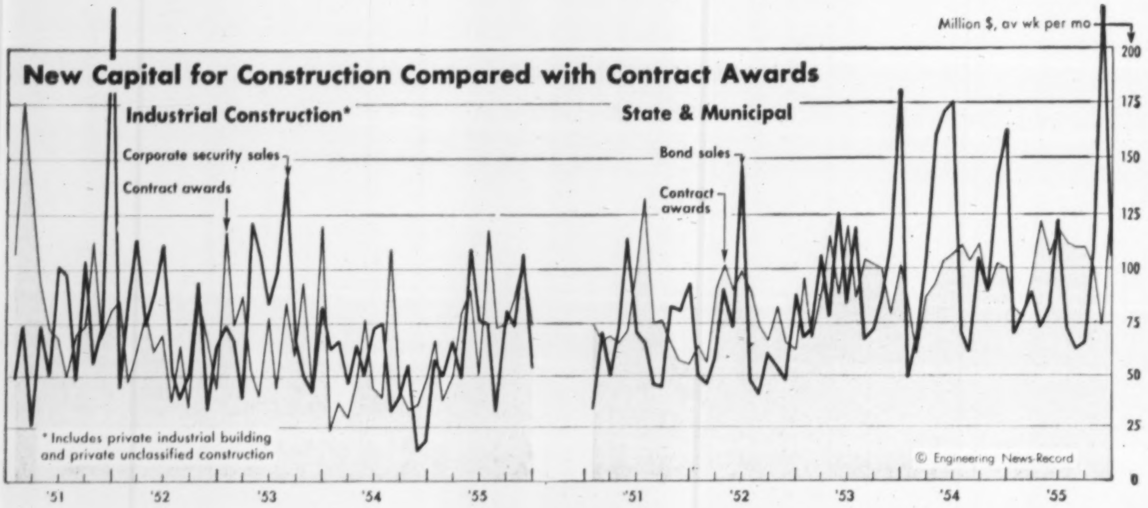

New Capital for Construction Compared with Contract Awards

* Includes private industrial building and private unclassified construction

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Industry Takes In 39% More New Capital

Investors dug deep into their pockets in '55 to supply American businessmen with funds needed to help finance a tremendous industrial expansion. They made it possible for corporations to sell securities to pay for more than $3.6 billion in construction. This was a whopping 39% increase over the volume reached in 1954.

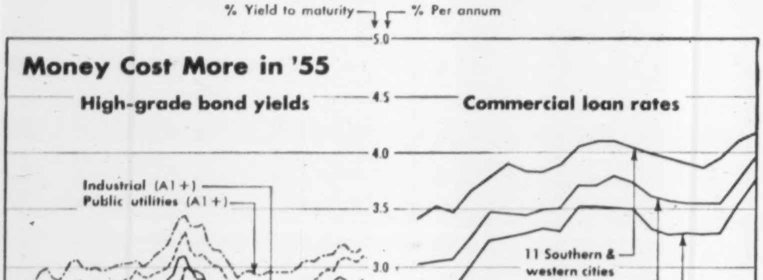
The chart above (left panel) shows the sharp upswing in security sales which accompanied the rocketing volume of contract awards for industrial construction during '55. Contracts for industrial construction totaled nearly $3.9 billion as reported by ENR. Of this, industrial building awards accounted for almost $3 billion, up 57% over the '54 total. In addition, private unclassified construction awards increased 58% to a record of more than $0.9 billion. This includes $324 million for pipelines which dipped 15% below '54. The dip was offset by increases in other types of private unclassified, particularly privately-owned hydroelectric plants.

In contrast to the upsurge in corporate security sales, state and municipal bond issues declined 16% in 1955. Increases of 6% in school bond sales and 10% in bonds for other types of public buildings except housing were offset by drops in issues for other types of work. Biggest factor in the overall drop was the 28% drop in highway bonds due to fewer large toll road issues such as swelled the totals in '53 and '54.

State & Municipal Financing Drops 16% in 1955 . . . Less Toll Road Financing is Big Factor

Bond sales for new construction money, in millions of dollars

	1952 52 weeks	1953 53 weeks	1954 52 weeks	1955 52 weeks	% change 54-55
All construction	$3,473.9	$5,031.1	$5,931.5	$5,008.0	−16
Buildings	1,593.4	2,114.8	2,018.9	2,132.9	+ 6
Schools	1,088.2	1,497.9	1,600.4	1,693.6	+ 6
Housing	317.3	283.1	112.4	102.2	− 6
Other buildings	187.9	333.8	306.1	337.1	+10
Heavy construction	1,844.5	2,916.3	3,912.6	2,875.1	−27
Highways	843.7	1,393.5	1,740.0	1,260.9	−28
Bridges	83.0	346.5	309.8	106.3	−66
Sewerage	228.0	421.5	382.4	355.9	− 7
Waterworks	217.2	326.9	376.2	366.3	− 3
Earthwork, irrigation & drainage	21.4	31.5	126.8	95.2	−25
Unclassified	451.2	396.4	977.4	690.5	−29



Money Cost More in '55

Source: Standard & Poor's

Source: Federal Reserve Board

Money Tightens and Borrowing Costs Rise

The money supply tightened in '55 as the Federal Reserve, attempting to nip budding inflation, raised its discount rates to crimp expansion of bank loans. This policy plus heavy demand for funds by construction and other business sectors brought higher interest rates on bonds and commercial loans (see chart on left).

Higher interest rates and periodic "gluts" in the municipal market caused some state and municipal agencies to hold off bond sales. Pierce, Carrison & Wulbern, largest municipal bond dealers in Florida, advised some of their client cities late in the year to delay putting out new issues because of this situation. New York and Connecticut held off some $225 million in highway bonds.

POWER HYDRAULIC CONTROLS and hydraulic-actuated clutches keep even the roughest jobs rolling smoothly. Hydraulic system eliminates need for more than 100 mechanical parts. Self-compensating clutches need no close or frequent adjustments.

TOUGH, IMPACT-RESISTANT STRUCTURE with all-welded, stress-relieved lower and upper frame helps rig absorb digging shock . . . handle the worst rock jobs with little need for maintenance and repair.

MORE POWER — Anti-friction bearings, splined shafts, precision machinery alignment help convert more of rated horsepower into usable power. Rugged construction permits use of extra power.

SPECIAL EXCALODER ATTACHMENT for underground loading or general bulk materials handling. The Excaloder features straight line bucket action and unusually low overhead clearance.

How to step up ROCK OUTPUT

Be ahead on every job with all these Link-Belt Speeder features

WHATEVER size rock rig you need, there's an advanced-design Link-Belt Speeder that can handle rugged work faster, easier, at less cost per ton or yard. Every Link-Belt Speeder rock shovel offers you Speed-o-Matic—the *true* power hydraulic control system. It's designed to make the operator's job so easy, so non-fatiguing that he'll utilize the machine to its full productive capacity—all shift long. And what a capacity! On-the-job figures show that Speed-o-Matic—even when the machine is wading through shot rock—accounts for output increases of up to 25% or more per shift!

Precision built throughout, a Link-Belt Speeder has an all-welded, stress-relieved upper and lower frame. Its power train features anti-friction bearings, splined shafts and cut spur gears. Quality construction like this pays off in lasting top performance, lower costs for maintenance and service.

For details, see your distributor or write LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.

Faster, stronger — from boom tip to treads

- Rugged, all-welded upper and lower frames, plus all-welded boom and dipper sticks for maximum strength-to-weight ratio
- All-manganese bucket*
- Powerful Independent Chain Crowd for positive crowd and retract, minimized maintenance
- Hydraulic dipper trip
- Torque converter units for greater shock absorption, multiplied torque when digging gets rough*

**Optional, extra*

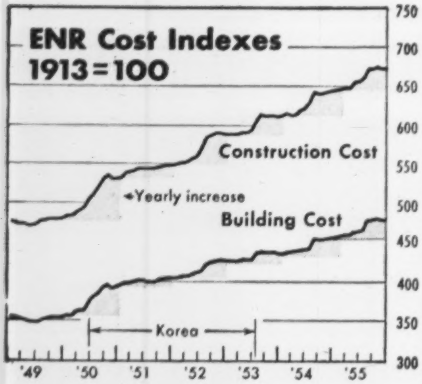
- Self-cleaning tracks and drive sprockets
- Powerful, two-directional automatic traction brakes which serve as digging locks
- Large diameter ring gear and conical rollers for faster, smoother swings
- Two-speed travel in either direction**
- Independent Swing and Travel that saves one hour a day in shifting time**
- Sealed track rollers keep grease in, dirt out**

***For most models*

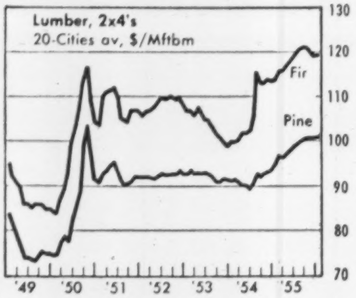
LINK-BELT SPEEDER

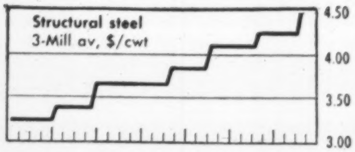
Builders of a complete line of crawler and rubber-tired shovel-cranes

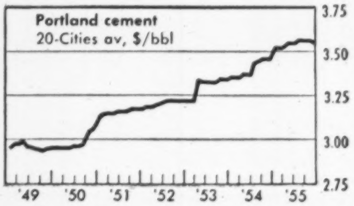
13,964


ENR Cost Indexes 1913=100

Costs go up nearly 5% in '55. Structural steel leads materials price rise with 8.2% increase.

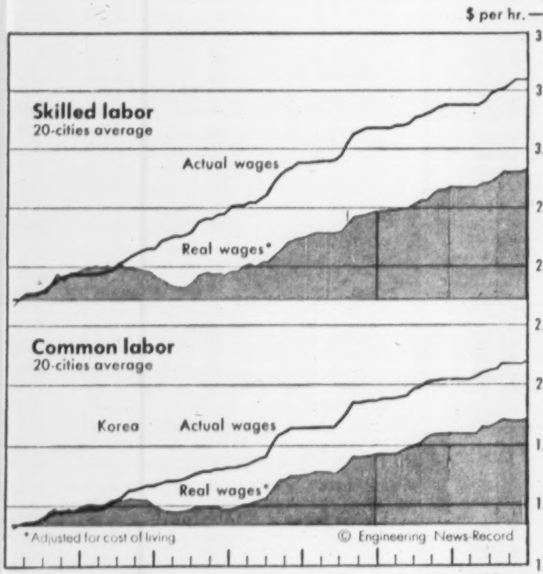






Construction Costs Rise 5% in 1955

Construction costs continued their relentless rise during 1955. The ENR 20-Cities Construction Cost Index rose 4.7% to 673.13, based on 1913 = 100, while the Building Cost Index increased 4.8% to 478.70. Percentagewise, the 1955 rate of increase in the Indexes was a little less than in 1954. This was because wage rates, cement and Douglas fir prices rose at a slower pace than in '54. However, structural steel and southern pine lumber prices climbed at a faster clip.



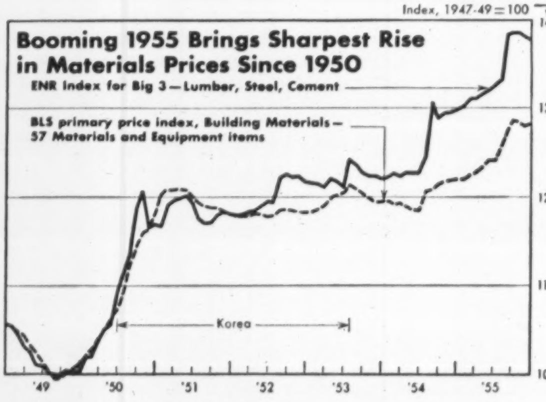
The base price of structural steel shapes at the mill jumped 8.2% last year, more than double the 1954 increase. The steel industry emphasized the necessity for larger earnings which could be plowed back into needed expansion of capacity.

Lumber prices advanced further during the year. A critical shortage of railroad boxcars hampered shipments, creating scattered shortages of Douglas fir lumber in several cities during the year and prices rose 4.9%. Southern pine prices reflected the pressure on fir, increasing 6.7%.

Cement prices rose 2.3% on the average in the ENR 20 Cities. However, this doesn't include the general mill price rise effective the first of this year.

Wage rates in the 20 Cities climbed an average 3.9% for common labor and 3.3% for the three key skilled trades (bricklayers 2.6%; carpenters 3.8% and structural ironworkers 3.4%). These increases were less than in '54 for all but the carpenters who made out better in '55 than in '54.

More widespread use of two-year contracts was one of the most significant results of 1955 bargaining sessions. A few unions negotiated contracts to run three or four years. While these contracts incorporate future wage increases, they help stabilize the wage rise so contractors can bid jobs knowing what labor rates will be a year or two ahead.


Booming 1955 Brings Sharpest Rise in Materials Prices Since 1950

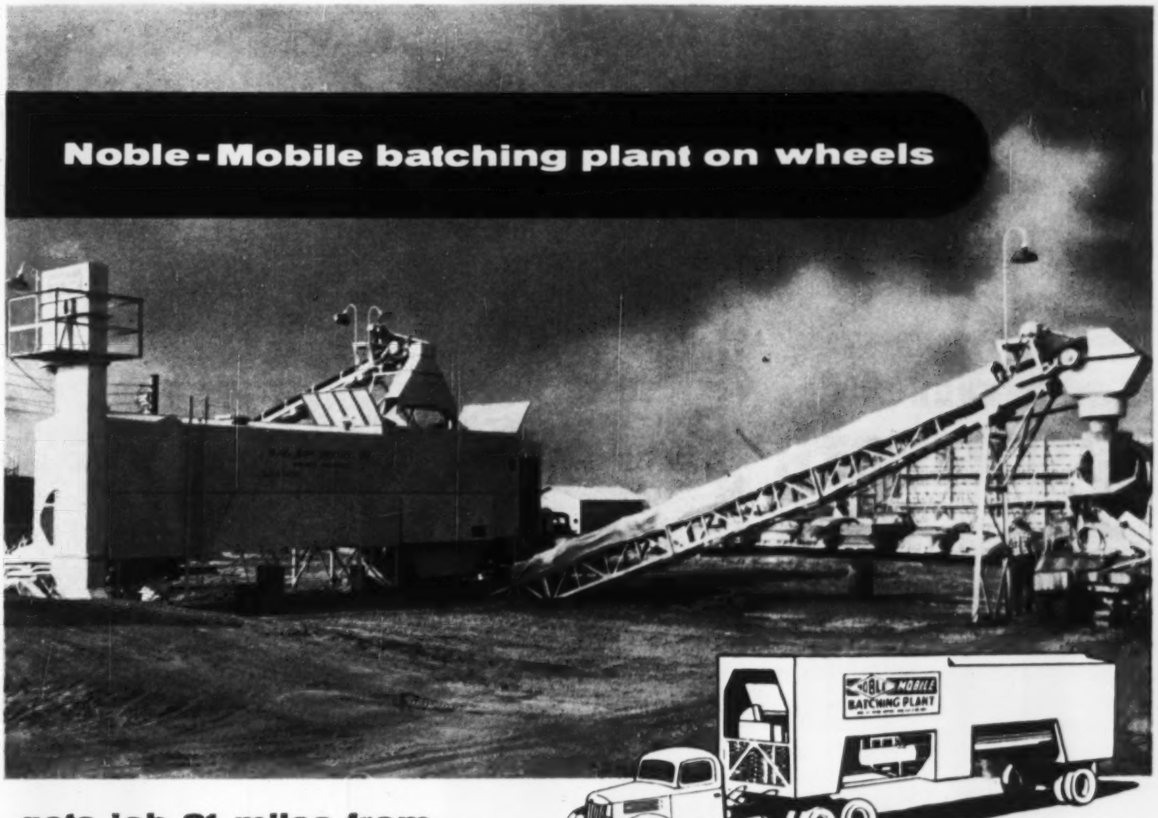
Materials Price Index Up 5.2%

The record volume of construction in 1955 caught suppliers short of many types of material. The resultant pressure on prices brought a widespread wave of increases. The ENR Price Index of the big 3 materials—structural steel, lumber and cement—rose 6.2%. The Bureau of Labor Statistics primary market index of building materials prices rose 5.2%.

The difference in percentage change between the two indexes is largely because structural steel is much more more heavily weighted in the ENR Price Index. Also, the BLS index includes many more items and price movements of relatively stable materials tend to dampen changes in more volatile items.

Prices of nearly all items in the BLS Index rose during '55. Plumbing equipment showed the largest increase, 12.1%. Next in order of increase were metal doors, sash and trim, up 10.4%, and hardware, up 9.9%. Prices of structural clay tile went up 6.8%. By contrast, gypsum prices were unchanged and there were declines of 1-2% in softwood plywood and insulation.

Noble-Mobile batching plant on wheels



gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile

Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H. W. "Heine" Gentry Co., Walnut Creek, Calif.

Hauled along highway like semi-trailer • Set up in one day—no field wiring, footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ... batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

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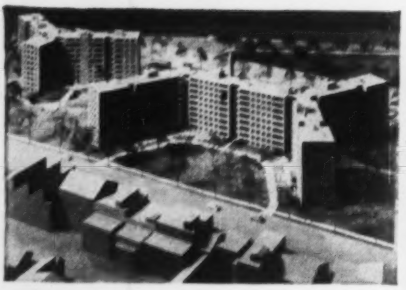

Public Housing Project Mo. 1-6, Phase 1, providing 660 dwelling units for low-income families.

Architects: Hellmuth, Obata & Kassabaum, Inc.; **General Contractor:** Millstone Construction Co.; **Engineer:** William C. E. Becker. All of St. Louis.

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. . . specify LACLEDE MULTI-RIB REINFORCING BARS

The attractive apartment group pictured is one of many large-scale public housing projects for which Laclede reinforcing bars were specified. These bars, with their outstanding multi-rib deformations, conforming to ASTM specifications A-305, represent the perfect balance between high strength and maximum anchorage.

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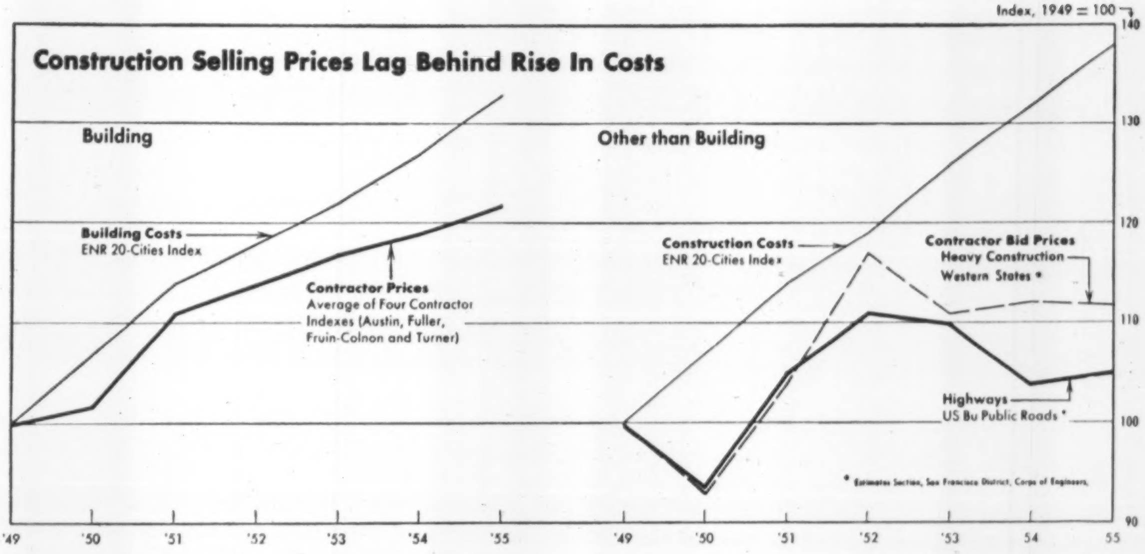


Contractors Raise Their Bid Prices

The rapid climb in materials prices and labor rates forced contractors to raise bid prices in 1955. Nearly all available bid price and selling price indexes tell this story.

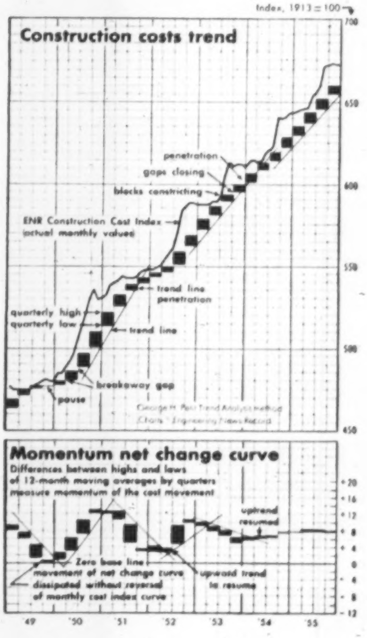
In California, for instance, average prices bid on state highway jobs during the second quarter shot 12.2% above the rock-bottom low of the first quarter. Fourth quarter bid prices were 10.6% higher than in the same quarter of '54. Bids on Oklahoma state highway projects in the fourth quarter of '55 were 12.3% higher than a year ago and in South Dakota they were up 13.9%. Texas shows a smaller rise of 2.9%. Idaho highway price index shows a spectacular 62% increase over the very low mark a year ago when an unusual combination of favorable factors pulled the index down sharply. Bids on Idaho projects let in the second half of '55 were about 11% higher than those that were received in the first half.

The U. S. Bureau of Public Roads Composite Mile Highway Price Index ended its prolonged downtrend in the third quarter of '55. By the fourth quarter it showed bid prices on federal-aid highway projects had increased 4.4% over the first quarter low.

Colorado and Washington are the only two states so far reporting bids in the fourth quarter of '55 falling below a year ago. However, the declines are moderate, ranging from 1-2%.

Bids on other types of heavy construction in the western states also increased during '55. The Denver Office of the U. S. Bureau of Reclamation composite index rose 6.5% by October after hitting the bottom of a decline in January. The San Francisco District Corps of Engineers index increased by 2.8% between the first half and second half of '55.

Contractor building price indexes rose faster in '55 than in '54. The Turner index rose 6.3% between January '55 and January '56 while the Fuller index went up 4.4% and The Fruin-Colnon index rose 3.4%. The Austin index increased 6.3% in the 12 months ended December.



Cost Rise Will Continue This Year

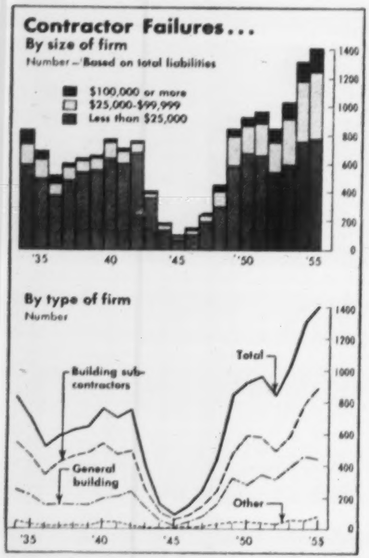
The uptrend in construction costs has lost none of its momentum. A further increase of about 4% in the ENR 20-Cities Cost Indexes appears to be in the cards for '56. Construction volume will boom to new record highs this year and pressures on materials supplies will remain.

Costs have been rising during the first few weeks of '56 and the increases in the ENR Cost Indexes have been greater than a year ago. This is largely due to higher cement prices which followed a general round of raises at the mills effective the first of the year. Furthermore, contrary to the usual seasonal dip, lumber prices have been firm with scattered increases so far this year. Douglas fir production and transportation from the mills in the Northwest were hit hard by rains and subsequent floods in December. Because of washed-out roads lumber has been hauled from mills by roundabout routes and increased transportation costs led to higher prices at a few cities in January. According to an ENR source, Douglas fir production "cannot possibly get back to normal before April—and more probably June." This situation will hold lumber prices firm and could mean further price increases when demand steps up.

Steel prices are due for another boost by mid-year, after the steelworkers negotiate their new contract.

Another round of wage increases will be coming along in the late spring to add to the pressure on costs. Many increases are already on the books as part of the two-year contracts signed in '55.

Contractors are expected to increase their selling prices under these conditions. Some state highway departments are already on record as expecting a further rise in bid prices. But even so, construction buyers will be getting a good deal because contractors have held the advance in their prices to a fraction of the steady climb in labor and materials costs.


Contractor Failures...

By size of firm

Number—Based on total liabilities

By type of firm

Number

Why Contractors Fail—Dun & Bradstreet

% of Total Contractor Failures 1953	1954	1955	UNDERLYING CAUSES	APPARENT CAUSES	% of Total Contractor Failures 1953	1954	1955
49.3	49.8	45.7	Incompetence	Inadequate sales	29.7	31.6	30.7
				Heavy operating expenses	22.8	23.1	17.7
17.4	21.9	19.7	Unbalanced experience*	Competitive weakness	19.8	22.1	26.1
				Receivables difficulties	13.7	14.9	16.0
14.8	15.4	19.0	Lack of managerial experience	Excessive fixed assets	4.9	5.1	6.6
				Inventory difficulties	2.1	1.4	1.2
				Poor location	0.6	0.5	0.4
8.1	4.9	7.1	Lack of experience in the line of work	Other	7.3	6.3	9.0
4.7	4.4	5.3	Neglect	Poor health	2.0	2.7	2.4
				Bad habits	2.2	1.1	1.8
				Other	0.5	0.6	1.1
2.5	1.8	1.4	Fraud	Irregular disposal of assets	2.0	0.9	0.8
				False financial statement	0.2	0.4	0.3
				Premeditated overbuy	0.0	0.2	—
				Misleading name	0.1	0.1	0.1
				Other	0.2	0.2	0.2
1.0	1.1	1.0	Disaster	Strike	0.5	0.3	0.4
				Fire	0.0	0.2	0.1
				Employees' fraud	0.2	0.2	0.1
				Flood	0.0	0.1	0.1
				Other	0.3	0.3	0.3
2.2	0.7	0.8	Reason Unknown				

*Management's experience not well rounded in sales, finance, purchasing and production.

Competition Pushes Failures to New High

Failures among construction contractors in 1955 hit a new high of 1,404 based on Dun and Bradstreet records going back to 1934. This is an increase of 8% over the preceding year, dashing hopes expressed last year for some letup in the ever-rising trend in construction bankruptcies. But severe competition has again raised its head despite the biggest year of construction activity on record. Liabilities involved rose a shocking 46% to $83.2 million.

Most disturbing aspect of the situation is the sharp (38%) increase in the big failures, those involving $100,000 or more in liabilities. In 1955, there were 165 contractors in this class, nearly 12% of all failures, and the highest percentage in this category since the early 1930s. Moreover, the liabilities involved shot up 87% to $52.7 million.

On the other hand, the proportion of contractors failing on the other end of the liability scale (those under $25,000) has been declining since the peak of 1942-43 when 89% of all financial difficulties occurred among the smaller contractors. Last year 777 contractor bankruptcies, 55% of all failures, involved liabilities of less than $25,000. This is an increase of 3% in number of failures, with liabilities rising 4% to $8.7 million.

Those going under in the middle group (involving failures from $25,000 to $99,999) increased 7% to 462, while their liabilities rose 8% to $21.8 million. This class of contractor failures has also been increasing its proportion of all failures, constituting 33% of the total in both 1955 and 1954 compared with only 9% recorded for 1942.

Of the 1,404 building contractors who failed in 1955, almost two-thirds were subcontractors. Numbering 880, up 11% from the preceding year, this group of building contractors has become increasingly prominent among those failing. General building contractor failures last year declined 3% to 443, but other contractor (outside of building field) failures jumped sharply to 81, a 45% increase, and a new high since records began in 1934.

What lies behind this appalling upward trend of failures in the face of big volume construction? Competitive weakness, says Dun and Bradstreet. Last year 26.1% of all contractor failures were laid to this cause compared with 22.1% in 1954 and 19.8% in 1953. In fact, it would seem that the construction industry suffers more from this malady than other businesses. Inadequate sales are blamed for 30.7% of all failures in 1955, about the same situation as in 1954. Heavy operating expenses accounted for 17.7% of failures, but this represents considerable improvement over the two preceding years. Difficulties in receivable collections and heavy fixed assets have become increasingly important factors in explaining the causes of contractor bankruptcies. (See table above.)

Behind these specific causes for failures in the industry lie the usual basic causes: incompetence (45.7%); lack of well-rounded experience in sales, financing, purchasing and production (19.7%); and lack of general managerial experience (19.0%). In 1955, incompetence gets somewhat less blame for contractor failures than in the two preceding years.

New Entries Up 15%

New construction firms coming into existence in the first half of 1955 numbered 40,900, a 15% increase compared with the same period of 1954. U. S. Department of Commerce records also indicate that in the 12-month period ending June, 1955, there were 66,700 new construction firms entering the field against 59,500 in the preceding 12 months. While this sets no record for new entries, it approaches the 69,500 for the year 1952. It falls far short of the new business firm formations of 1947 when 73,800 concerns got under way.

In the 12-months ending June, 1955, some 50,900 firms discontinued business in the construction industry, either because of failure or through voluntary withdrawal. This is about the same as in the period ending June, 1954, when 50,700 left the field.

The net result of these new entires and withdrawals was a new high in the total number of firms operating in the construction industry as of June, 1955. The 457,100 contractor firms in operation at that time reflected a 3.5% increase since the end of 1954. This increase, by the way, was sharper than for any other line of business. It meant the net addition of 15,200 firms within the first six months of 1955. This may explain some of the severity in competition for business that has taken such a heavy toll of construction firms in recent years.

(Advertisement)

New Rotary Trowel enters field

STOW ROTO-TROWEL FINISHING A SUPERMARKET FLOOR. Before trowelling, a Stow screed was used to strike-off the surface. By screeding and using a 1" slump concrete, the concrete set up so fast, they were able to put the Roto-Trowel on the job only 1 hour after screeding.

"What we need is a really rugged trowel, one that can't get away from you and crack up", said one veteran concrete man when interviewed.

Because Stow Manufacturing Company, makers of concrete vibrators and screeds in Binghamton, New York, decided to make a Rotary Trowel, an exhaustive study was conducted to find out what concrete men wanted in a Rotary Trowel. Stow knew they were getting into a field where competitive manufacturers were well established, and that they had to come up with a machine that would be superior to any other on the market.

Thousands of dollars were put into the design and perfection of the Stow Roto-Trowel. The result: the G-34 Roto-Trowel; a rugged, safe, easy-to-handle machine that trowels smoothly.

Probably the most outstanding feature on the G-34 Roto-Trowel is the stationary guard ring, instead of the conventional rotating type. With the rotating type guard ring, the operator must be extremely careful whenever he works near walls and obstructions; if the ring should touch any object, it could wreck the trowel and injure the operator. With the Stow Roto-Trowel's strong stationary guard ring, the operator can trowel much closer to walls and obstructions with no fear of accidents.

Another feature is the fool-proof clutch control. This is a manually actuated clutch controlled by a lever on the handle. The instant the operator releases pressure on the handle, the blades stop rotating. The engine, however, continues to operate, thus eliminating the need to re-start the engine. This type clutch is an important safety feature of the Stow Roto-Trowel; and unlike centrifugal clutches, the engine can be started at full throttle. With this type of drive, the operator can throttle the trowel down from 100 RPM to 25 RPM where special conditions require slow speed.

THIS DEAD-MAN CONTROL on the wide crossbar of the handle immediately stops the machine, but not the engine, when it is released.

The Stow G-34 Roto-Trowel is powered by a 2½ HP gasoline engine which supplies ample power for even high slump concrete. The unit has an adjustable handle so the operator can set the height to his most comfortable operating position. This feature, plus the wider handle, makes the Roto-Trowel much easier to maneuver, regardless of the height of the operator.

On a construction job where one Stow Roto-Trowel was put in among competitive trowels, the contractor discovered that his trowel operators were actually arriving on the job early each day in order to use the Stow Roto-Trowel. They found it much easier to handle.

A hook mounted on top of the engine makes it easy to lift the Stow Roto-Trowel to higher levels. A knob on the handle controls blade pitch while the machine is running. All three blades fit into recessed slots to insure correct seating; each is secured by a hand-turned wing nut for quick changing. Float blades are 10 x 14 inches; finish blades are 6 x 14. Finish blades are made of the finest steel available, chrome vanadium, and can be reversed for double life.

The G-34 Roto-Trowel, complete with a set of float and finish blades, weighs 143 lbs. and is 34 inches in diameter.

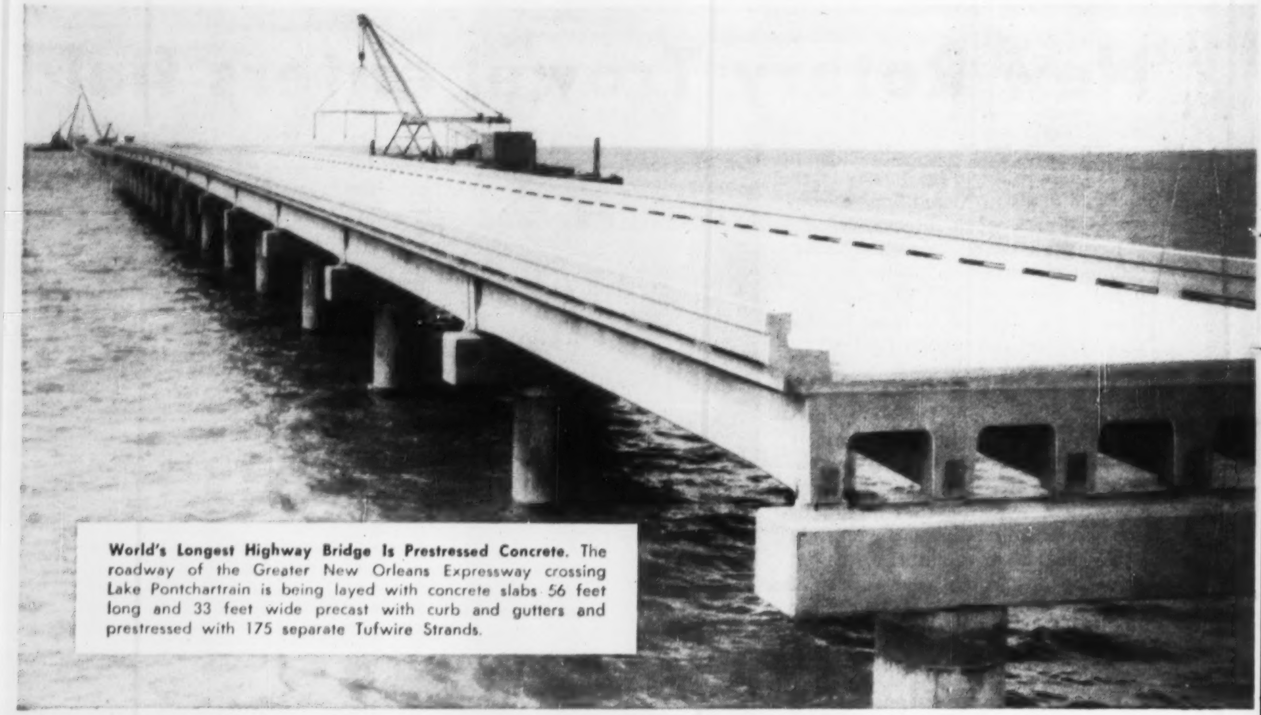
Stow now has a 24-inch model, the G-24, and a big 4-bladed 46-inch trowel, the G-46. A 34-inch electric trowel is also available with a 1½ HP motor.

Contact your nearest Stow Distributor for a demonstration, or write Stow Manufacturing Co., 19 Shear St., Binghamton, N. Y. Ask for Stow's complete catalog on Concrete Vibrators, Portable Concrete Grinders and Vibrating Screeds, and Rotary Trowels.

STOW MANUFACTURING COMPANY

19 Shear St. Binghamton, New York

Originators of the Flexible Shaft



World's Longest Highway Bridge Is Prestressed Concrete. The roadway of the Greater New Orleans Expressway crossing Lake Pontchartrain is being layed with concrete slabs 56 feet long and 33 feet wide precast with curb and gutters and prestressed with 175 separate Tufwire Strands.

Prestressed Concrete is a "Comer" with Adaptability Unlimited...

Almost anything that concrete will do—it will do better when prestressed. As a matter of fact, prestressed concrete may be used in sections which are not possible with reinforced concrete.

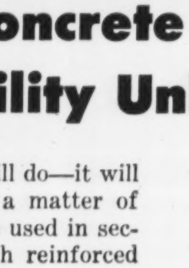
It is structurally sounder because the compressive stress imposed by prestressing cancels out tensile stresses against which concrete is inherently weak. Tension cracking is minimized.

Prestressed concrete is economical—fully competitive. Less concrete and less steel is needed.

The designing of prestressed members is not difficult when based upon a fundamental knowledge of the strength and mechanics of materials. Many experienced designers and engineers now offer dependable consultive service to firms who have or are about to enter into the most promising business in the construction field — the manufacture of prestressed concrete products.

The adaptability of prestressed concrete is unlimited. Here are a few concrete products now being prestressed. I beams, T purlins, tilt-up and tongue and groove wall siding, channel panels and slabs for floors and roofs, pipe and tanks, fence and lamp posts, highway and airport slabs, bridge and wharf pile, slabs, stringers and girders, complete warehouses, shopping centers, stadiums, gymnasiums, schools and commercial and industrial buildings.

Prestressing offers opportunities not only to on-site contractor, but also to the permanent site fabricator of concrete products of every description. We can put you in touch with reliable engineering and design consultants. Our engineers will work closely with you on your stress relieved wire and strand specifications.



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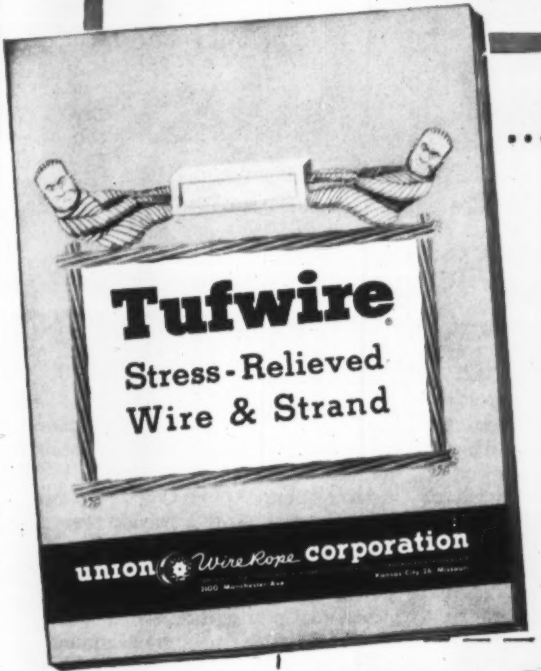

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The research and production facilities of Union Wire Rope Corporation have been geared to the seven-league strides of prestressed construction since the trend began shaping up some ten years ago. Our expanding plant capacity and central location in Mid-America have made us the ideal source of supply for the strand and wire that form the "tendons" of prestressed concrete.

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HOUSING continued to boom in 1955, as huge projects, such as Park City in Queens, N. Y. (shown above), swelled the total.

Design Innovations Pace the Building

The building industry snowballed through 1955, and still gathering momentum, headed into 1956 with enough energy to assure another boom year. While few records may topple, proposed work makes certain a high level of activity in all building classifications.

Despite the pressure last year's heavy work load put on architects and engineers, not all buildings produced were routine. Trends toward greater use of newer materials and construction techniques discernable in 1954 continued in 1955. And in addition, some new trends appear to have started.

To mention only a few: As a result of renewed interest in space structures, a rash of folded-plate concrete structures sprang up across the country, and a new-type space truss made its debut. Work started on a hangar with roof suspended from cables, and at year's end, at least two more were certain of construction. A new device for transmitting shear from beam flanges to concrete slabs was introduced for composite construction, both for buildings and bridges. And continuation of the trend toward cantilever construction noted in previous years was accompanied by a sudden upsurge in hung-span construction (simple beams supported on cantilevers).

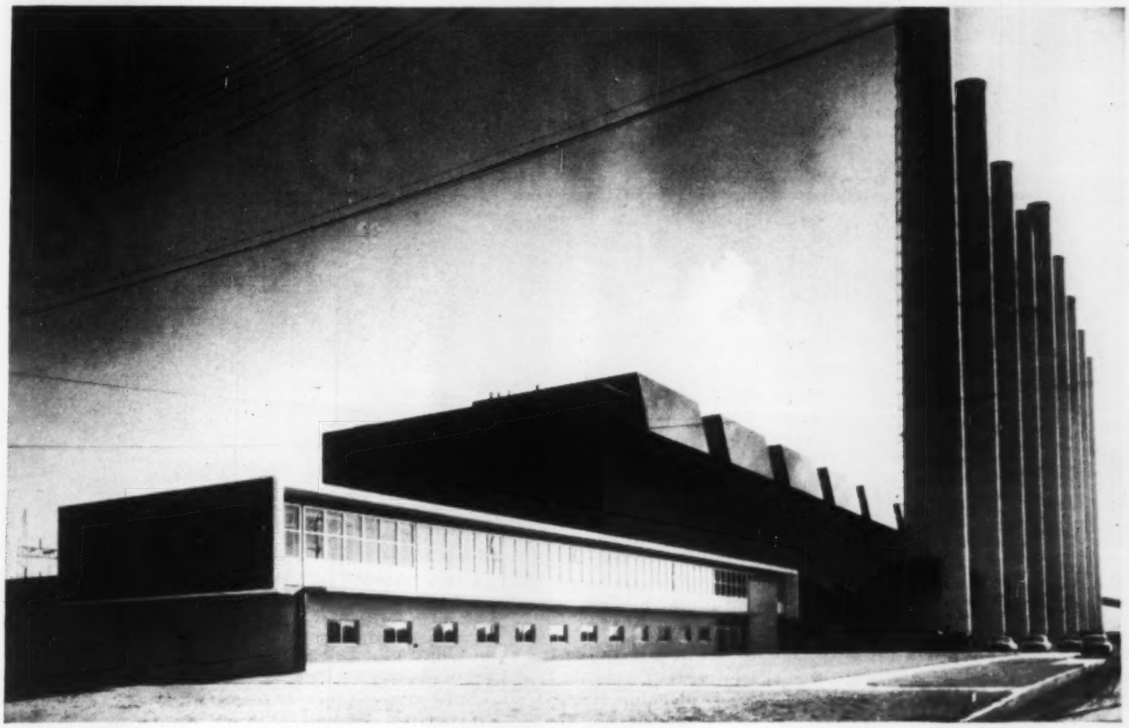
• Commercial building sets record—For the third year in a row, the volume of non-residential commercial building set a new record. Though the high level of shopping-center construction fell off toward the end of 1955, the continued boom in office buildings sent the value of contract awards skyrocketing to $1.66 billion. This is 17% greater than the previous high mark.

However, the new record again is not expected to stand for long. New work continues to be proposed at a terrific rate.

Meanwhile, industrial building, which had not been doing too well recently, came back strong last year, though far from record-breaking. Contract awards totaled almost $3 billion, up 57% from 1954. Despite the increase, fewer projects were constructed, indicating a trend toward bigger plants.

• Housing does well, too—From one viewpoint, private homebuilders set a new record last year; from another, 1955 was their second-best year. Housing put in place reached a new peak of $16.6 billion, well above the previous high, posted in 1954. However, housing starts totaled about 1,300,000 units, 75,000 short of the record set in 1950. Here, too, studies indicate a trend toward bigger units. (Public housing starts were almost negligible, as in 1954—about 19,000).

In contrast to their optimistic attitude at the end of 1954, homebuilders entered 1956 in a pessimistic mood. They claimed that starts were falling off because of credit tightening resulting from federal curbs on down payments and shortening of maturities on



TVA'S KINGSTON PLANT—world's largest steam-electric generating station—went on the line last year.

Boom

mortgages from 30 to 25 years. Nevertheless, easy credit played a major role in last year's housing boom; VA-insured mortgages, for example, set a new record, with 650,000 veterans receiving home loans totaling more than $7 billion—20% above the previous record, set in 1947.

This would indicate that homebuilders are getting along better now with the Federal Housing Administration and Veterans Administration mortgage-processing procedures than in 1954. However, other problems that plagued them in 1954 continued to do so last year and probably will worsen this year: (1) Maintaining a sufficient flow of long-term credit in those geographical areas and price classes where housing need is greatest. (2) Obtaining acceptable sites and financing for minority housing. (3) Solving the problems of scarcity and increasing cost of developed lots. (4) Holding other construction cost lines against steady upward pressures by labor and some materials and equipment. Also there is evidence that as a consequence of the high level of building activity, homebuilders may face a labor shortage. Yet FHA predicts 1,300,000 starts for 1956.

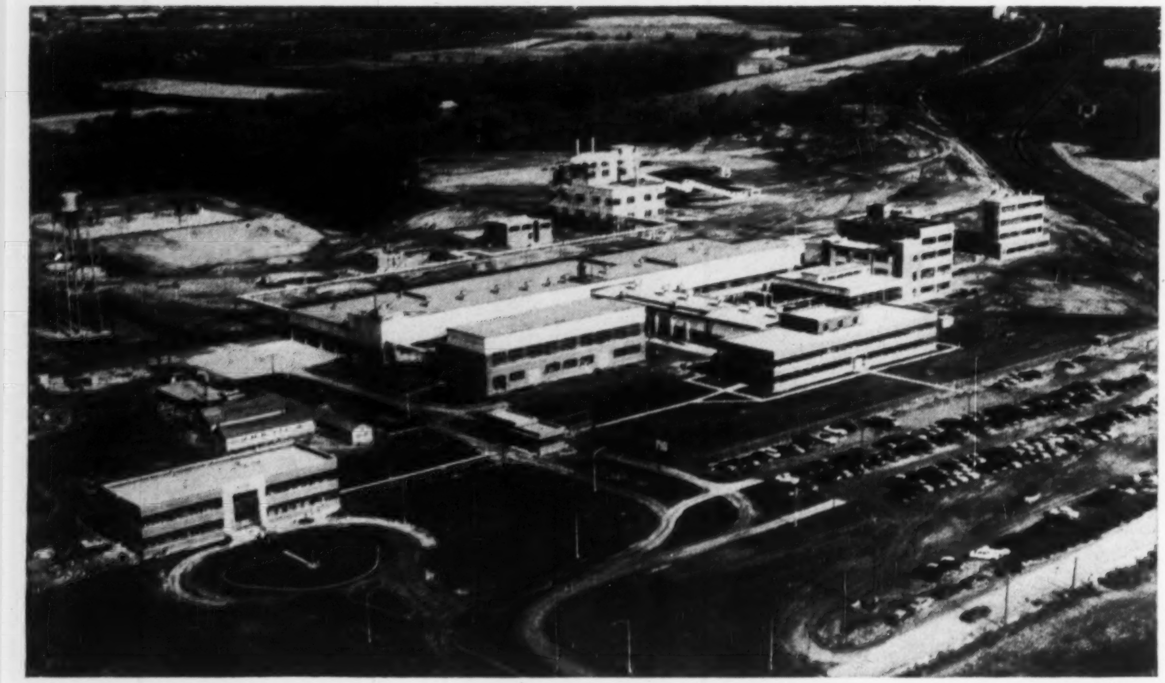
• **Housing legislation**—Continuing the postwar trend, Congress again passed legislation to stimulate homebuilding. The National Housing Act of 1955 continued the Title I program for home-improvement loans, authorized $500 million in capital grants for slum clearance and urban redevelopment, provided for 45,000 public housing units in the fiscal year ending next June and authorized funds for armed services and college housing. It also gave FHA $4 billion additional mortgage-insurance authority, bringing the total committed under the FHA guarantee program to $27.5 billion.

The act also removed the Home Loan Bank Board from the Housing and Home Finance Agency. As a separate entity, it will be known as the Federal Home Loan Bank Board. In practice, the new setup is expected to make credit easier through savings and loan associations.

• **New housing center**—From the viewpoint of homebuilders, a highlight of 1955 was the opening of a National Housing Center in Washington, D. C. Serving as headquarters for the National Association of Home Builders, the eight-story building also provides 30,000 sq ft of exhibit space for building materials and equipment on six levels, open to the public. The center also contains a central reference library on house construction and an auditorium. It was inspired by housing centers in Europe, particularly the Bouw Centrum in Rotterdam and the London Housing Center.

• **Lease-purchase trend** – Last year, public-building volume continued at close to the 1953 and 1954 rate. However, prospects for improvement are excellent. For one thing, the federal government's lease-purchase program will get started this spring; for another, a big school and hospital program is still ahead.

In 1954, Congress passed a law permitting some federal agencies to award lease-purchase contracts for new buildings. More than 50 projects, totaling $105 million, have been approved for the General Services Administration and the Post Office. Design contracts for most of them have been awarded, but construction has not started yet. Bids will be taken both from investors (on interest rate)



INDUSTRIAL BUILDING made a comeback in 1955, as huge factories, such as this $18 million antibiotics production plant for Eli Lilly & Co.—Tippecanoe Laboratories—at Lafayette, Ind., were constructed.

and builders (lump-sum price for construction).

• **Prospects for schools**—Congress has not yet acted to assist school construction, except for areas affected by federal activities. Early last year, President Eisenhower proposed that the federal government give grants to "pauper" districts, guarantee and insure school bond issues by the states and help the states set up authorities to finance and build schools. He failed to get sufficient support in Congress, while none of the legislators could arouse support for a program of fixed annual grants and loans to the states.

The President also called a series of conferences in every state to discuss possible solutions to school problems. These terminated in the "White House Conference on Education," a national meeting, which submitted a report to the President.

According to the report, the overall U.S. need will be 470,000 classrooms in the next five years, of which 210,000 are needed immediately. Last year, however, only about 67,000 new classrooms were completed (cost, $2.5 billion). Yet, no state has proved that it is financially incapable of building the schools it needs in the next five years. Furthermore, only a few of the states have plans that indicate a political determination powerful enough to overcome obstacles (ENR Dec. 8, 1955, p. 21). Two-thirds of the 1,800 delegates attending favored federal aid.

Studies made by the U.S. Office of Education indicate that even without federal help, 410,000 new classrooms can be built in the next five years. Present Administration and Congressional proposals would add about 60,000 more, with federal grants, to be matched by the states, averaging between $250 million to $400 million annually. Biggest hurdle will be an anti-segregation amendment, which, if adopted, would kill chances of a bill passing at this session. Prospects for school construction furthermore depend greatly on what will be written into the act as incentive to the states and local districts to put up more funds.

• **Outlook for hospitals**—The federal-aid program for state, local and private non-profit hospitals picked up during 1955.

The public health service in 1955 approved some 260 new projects costing $225 million as compared with 204 projects having a total cost of $173 million in the previous year.

Total value of projects under construction at year's end stayed about level at $560 million. At the end of 1955 there were about 536 hospitals and health units in some stage of construction. A year earlier, projects under way numbered 484.

Since the Hill-Burton program began in 1947, it has completed nearly 2,000 hospitals and health units. These projects cost $1.5 billion in all, of which the federal government contributed a little more than one-third.

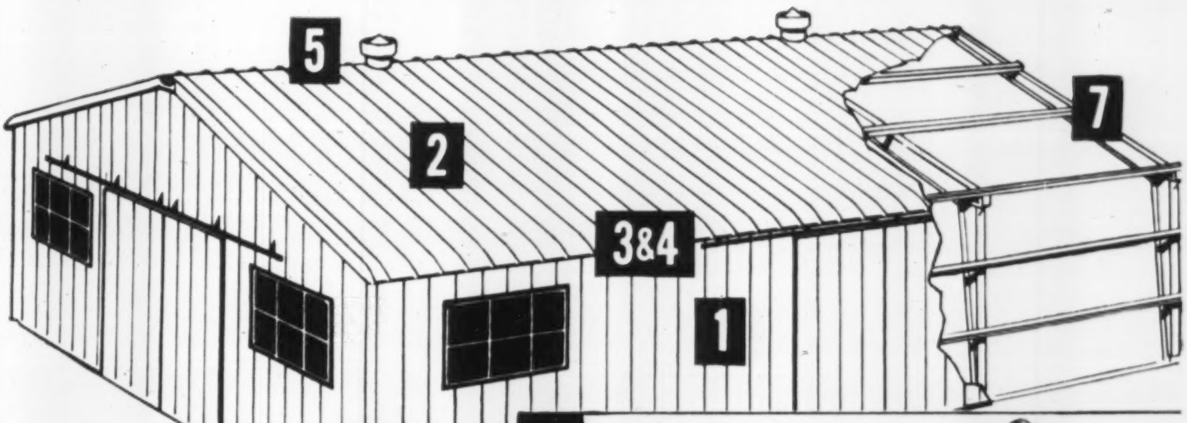
Eisenhower has recommended another two-year extension of the program to keep it operating until June 30, 1959. Congress is expected to go along.

Federal grants totaling $210 million a year are authorized under present legislation—$150 million a year under the original Hill-Burton program plus $60 million added in 1954 for construction of supplemental health and nursing facilities.

Present level of construction activity on these federally aided hospital and health projects is a little more than $200 million a year. By the end of 1956 the rate of construction expenditure will go up to about $250 million, with the federal government paying about one-third.

If local and state projects came forward in sufficient number, the authorized program would support $600 million a year of new construction. There is little question that Congress would vote funds to pay the federal share of as many qualified projects as the states and localities can originate.

• **Impact of nuclear energy**—Expenditures by the Atomic Energy Commission for construction started off last year at the rate of $57 million per month, but tapered off during the second half of the year to $26 million—the money going mostly for production facilities for fissionable materials—and are expected to continue at this rate through 1956. But new develop-



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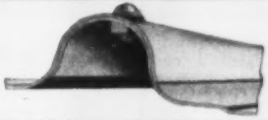
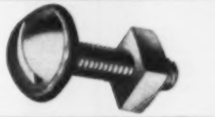
1 **Die-Formed Corrugated Panels.** Extra strong. High-rib corrugations. Formed on 12" centers. Weather-sealing compound on roof panels assures extra weather-tightness.



2 **Weather-Tight Bolts.** Galvanized, with weather-seal washers. Inserted through precision-punched holes. High strength bolts used on bolted structural field connections.



3 **Die-Formed Eave Panels.** Neatly turned, one-piece. Add strength, trimness, finished appearance. Easily bolted to roof panels to increase speed of erection, lower costs.

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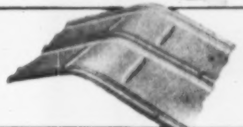
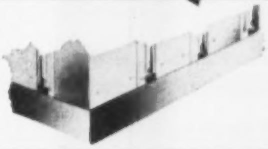


6 **Weather-Seal Base.** Corrugations in panels are sealed at base of building, fit flush against foundation to keep out rain, snow, sleet.



7 **Butler rigid frames** are latest design wedge-beam construction, for maximum strength per pound of steel. Purlins and girts are high-tensile, cold-formed steel. Every panel is double-bolted through a girt or purlin for extra rigidity.

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WIND TUNNELS and other test chambers for jet engines and guided missiles take shape at the Air Force's $250 million Arnold Engineering Development Center, Tullahoma, Tenn., now 70% complete.

ments during 1955 may prove to have more effect on future construction than these expenditures.

To appreciate the significance of these developments, it is well to recall some pertinent preceding conditions: Under the Atomic Energy Act of 1946, development of nuclear energy was established as a government monopoly. In 1954, Congress opened the way for private industry to cooperate with the government on nuclear power. To initiate the partnership, the AEC established a five-year power reactor program, calling for an outlay of more than $200 million.

Under this program, five experimental power reactors are being built, each of basically different design. The first large-scale, central nuclear power plant in the U. S.—the pressurized water reactor Duquesne Light Co. is constructing at Shippingport, Pa.—is one of the five. Largest in the program, it was put under construction last year. Although this plant will deliver 60,000 kw of electric power to the Pittsburgh area sometime in 1957, it is not expected to be economic. The objective is to obtain technological and cost data that could not be obtained otherwise.

At the beginning of 1955, the AEC initiated a second reactor program—the power demonstration reactor program. This will be financed to a substantial extent by private capital, whereas cost of the five-year power program is borne entirely by the government. Both private utilities and public power groups are being given the opportunity to build, own and operate nuclear power plants. Government payments will be for technical and cost data resulting from construction and operation of these plants.

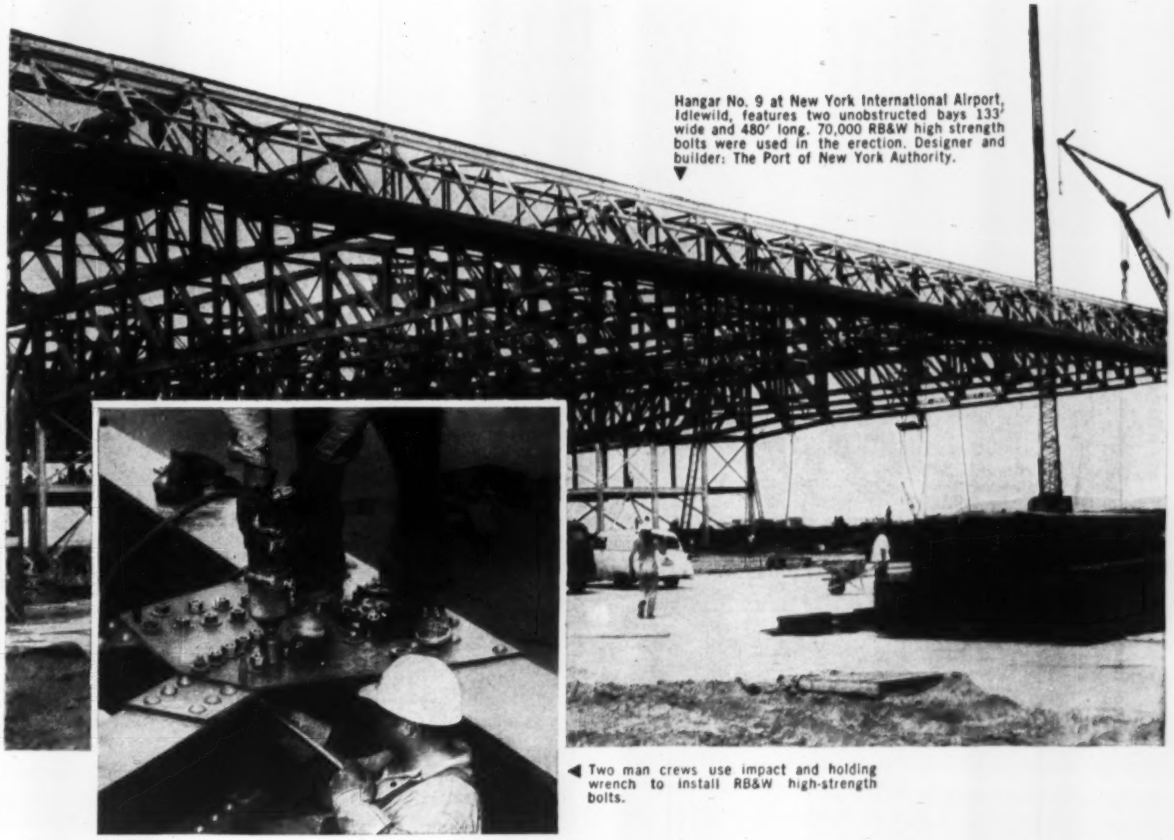
The AEC received four proposals in response to this program—for plants ranging in capacity from 75,000 to 180,000 kw. In addition, two companies announced plans for nuclear plants that will be completely privately financed.

Because of this favorable response, the AEC last September set in motion a second round, to encourage proposals for smaller plants—from 5,000 to 40,000-kw capacity. These reactors are designed to serve smaller areas and probably will be constructed by smaller groups; so it may be necessary for the government to pay for part or all of the reactor portion of the plants. Meanwhile, the Army started construction last year of a package power reactor of 2,000-kw capacity.

Thus, under government stimulation, a new market for construction is opening up. Some utility experts predict nuclear power plants will offer at least $500 million in new construction business annually by 1965. In addition, supplementary construction will be necessary to provide plants for fabricating and reconditioning fuels and for making reactor parts, plus research laboratories, water and waste-treatment plants, and factories for making instruments and handling equipment.

Opening up nuclear development to private industry had another effect: Information formerly classified as secret had to be made available. Because of the vast amount of data suddenly freed, 26 engineering and scientific societies sponsored, and the Engineers Joint Council coordinated, a Nuclear Engineering and Science Congress in Cleveland, Ohio, last December. More than 250 papers were presented, covering a wide range of subjects (ENR Dec. 22, 1955, p. 13). With available data spread on the record, future conferences need only consider new developments.

• **Civic center trend**—Public building got an added lift last year from still another source—civic centers. These are clusters of municipal buildings erected in accordance with an overall plan for development of an area. When a city is built from scratch—like Washington, D. C., or Oak Ridge, Tenn.—it is natural to concentrate municipal buildings in one area for convenience. But when cities grow haphazardly—and most cities do—municipal officials are forced to rent space for needed additional facilities or spot new buildings wherever sites are avail-



Hangar No. 9 at New York International Airport, Idlewild, features two unobstructed bays 133' wide and 480' long. 70,000 RB&W high strength bolts were used in the erection. Designer and builder: The Port of New York Authority. ▼

◀ Two man crews use impact and holding wrench to install RB&W high-strength bolts.

BOLTED hangar goes up FAST

Extensive field assembly also done economically with RB&W High-Strength Bolts

HERE'S bolted steel construction with a few new twists.

Using RB&W high-strength bolts, the Lehigh Construction Company, Inc. (division of Lehigh Structural Steel Co.) fastened members together virtually from the ground up. Almost all assembling was done right in the field since height of truss sections came to 22 ft. Cranes then raised into place the big assemblies weighing up to 74 tons. These were fastened with RB&W bolts to form the double cantilever structure of the hangar being built by the Port of New York Authority for occupancy by Eastern Air Lines.

Because bolting is a fast operation and uses two-man crews, field assembly was economical.

Moreover, high-tensile bolts are safer to install and stronger than rivets. RB&W high-strength bolts clamp members together *permanently tight.* They develop optimum joint strength.

RB&W bolts have the controlled, uniform quality you can depend on, proved on all kinds of jobs. Their performance has helped to make RB&W the largest independent supplier of high-strength bolts for construction.

For more information on this modern joining technique, see the RB&W catalog in Sweet's Architectural or Industrial Construction File (2cR/VO) or send for "High-Strength Bolts," reprinted from Architectural Record.

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LEVITTOWN, PA., added 3,000 houses in 1955, bringing the total to 13,000. Levitt & Sons plan 4,000 more by year's end.

able at reasonable cost. So until recently, most cities have been able to do little more than formulate plans for the future.

However, a spot check around the country shows that civic centers are springing up now at a rapid rate. Two major influences appear to be responsible for the upsurge. One is the rapid increase in population and the resulting need to expand municipal personnel and services. The other is the growing importance of urban redevelopment. Encouraged by federal aid, in the form of grants and loans, cities are hastening to take advantage of the opportunity of reclaiming rundown areas and simultaneously activating their plans for civic centers.

• Buildings vs A-bombs—Last year's building boom tended to encourage, rather than hinder technological progress in design and construction. During 1955, for example, the AEC set off a nuclear explosion equivalent to 35,000 tons of TNT, to test the blast effect on typical residences, industrial buildings and utility installations (ENR May 12, 1955, p. 21). In brief, here is what was learned:

1. Buildings designed for earthquake resistance have substantial blast resistance.
2. Far greater blast danger to building occupants comes from broken glass, doors, window shades and other easily detached components than from structural damage.
3. Utility poles and towers that are guyed survive atomic blasts better than unguyed installations.
4. Underground piping is highly resistant to blast damage.

• Noteworthy trends—Many of the more significant trends noted in 1954 continued in 1955. For example, thin walls for skyscrapers continued to make headway, paced by an increased demand for porcelain-enameled steel facings. The preferred application appeared to be installation of relatively small panels in metal frames, like window glass, rather than story-high panels.

Another example is the steady growth in use of lift-slab construction. At the same time, designers became bolder in their applications of the technique. In several parts of the

NEW YORK COLISEUM is three buildings in one—four-level exhibition hall, 20-story office building and 850-car parking garage.

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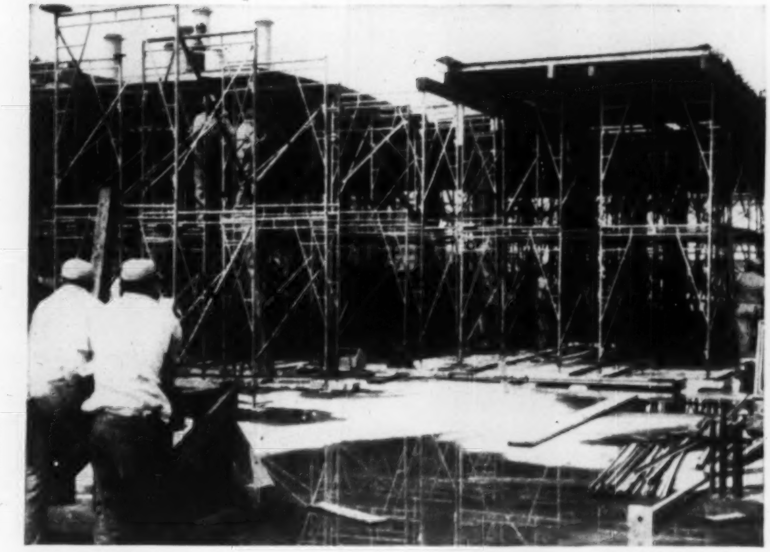
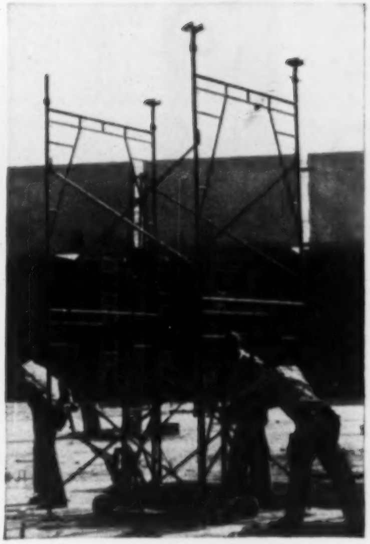


THIS UNIQUE SYSTEM of moving complete sections of shoring to new pour areas is used by Wigton-Abbott Corp., Plainfield, N. J., to eliminate the job of disassembling and reassembling the shoring. Eleven "Trouble Saver" Sectional Shoring units, each covering 720 sq. ft., are pulled on wood sills by a hand winch. Each unit was slid three times for succeeding concrete pours during construction of the 189' x 231' Monsanto Chemical Co. warehouse, Kearney, N. J. Form work was "permanently" placed on those sections between drop heads.



WHEELED HYDRAULIC dolly is used to move four-frame unit of "Trouble Saver" Shoring to next pour. This system speeds operation for William J. Moran Co. on Emporium-Capwell Co. warehouse covering a city block in Oakland, California. 3,600 frames were used on this building.

Good Planning Cuts Shoring Costs

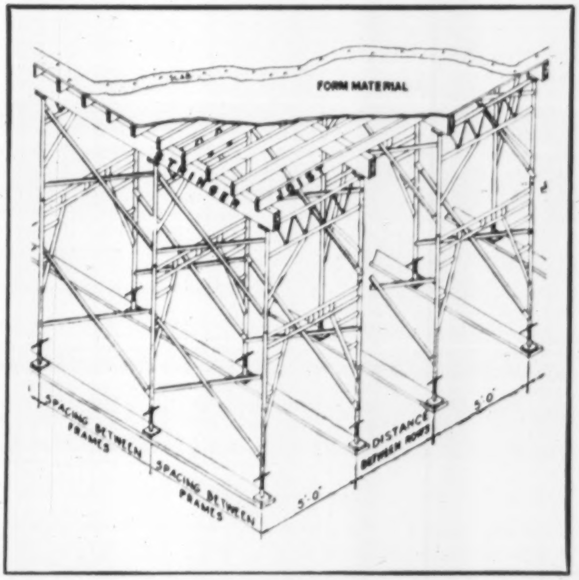
ONE OF THE MOST IMPORTANT advantages of modern sectional steel shoring is the fact that it can be planned on the drawing board. Load bearing strength can be accurately calculated, the number of units pre-determined and the whole installation laid out to assure greatest efficiency on the job.

It is during this planning period that the engineering ability, experience and imagination of The Patent Scaffolding Co. Inc., pays dividends to the contractor. For when a shoring installation is properly laid out on the drawing board, a lot of time, money and trouble are saved on the job.

First, PS Co. helps the contractor select the right kind of shoring by carefully studying the character of the job. Contractors planning with PS Co. have a choice of three types of steel shoring: "Trouble Saver"® Sectional, "TubeLox"® tube and coupler type Shoring and Burton's single post Shores. Once selected, the shoring is laid out to carry the desired loads with an adequate factor of safety and also to get maximum re-use from the number of units needed. Unique methods of rolling, sliding and lifting entire sections of sectional shoring from one pour area to another are often worked out at this stage too.

The complete story on PS Co. Shoring can be found in Bulletin PSS-33 "Modern Shoring for Concrete Construction". It's available at no obligation from the Patent Scaffolding Co., Inc.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.



SAFE WORKING LOADS for "Trouble Saver" Sectional Steel Shoring vary according to spacing between 5'-wide frames, distance between rows, and position of stringers on frames. This prefabricated, engineered shoring will handle the heaviest loads and provides a clean, neat installation. It is easily adaptable to all types of construction: flat slab, slab with drop head, pan joist, poured arch and beam.

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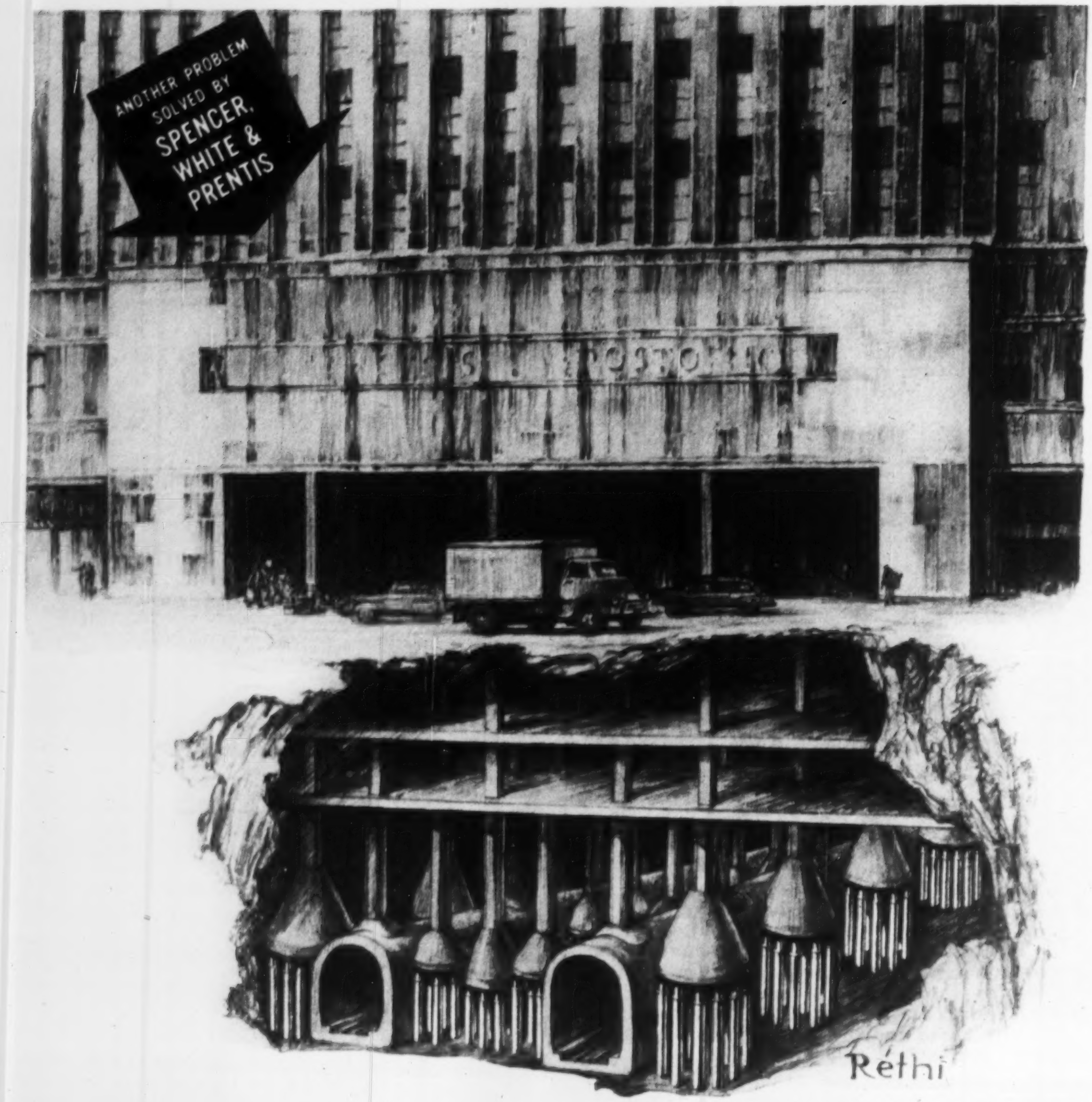
ANOTHER PROBLEM SOLVED BY SPENCER, WHITE & PRENTIS
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Project: Underpinning Main U. S. Post Office, Chicago, Ill. — *Contractor:* S. A. Healy Co., Chicago, Ill.

DEEP PRETEST PILES UNDERPIN CAISSONS BLOCKING CHICAGO'S SUBWAY TUNNEL

While digging under the city's main post office, the contractor for Chicago's new subway ran into his biggest headache. Instead of caissons extending to rock, he found belled caissons blocking further progress.

At that stage Spencer, White & Prentis were awarded a contract to underpin 16 of these caissons. The drawing shows our completed Pretest piles carrying the caisson loads (some up to 2,400 tons) to hardpan. Perhaps you would like us to explain how the Pretest method, pioneered by this company, transfers loads safely and dependably, and precludes danger of future settlement.

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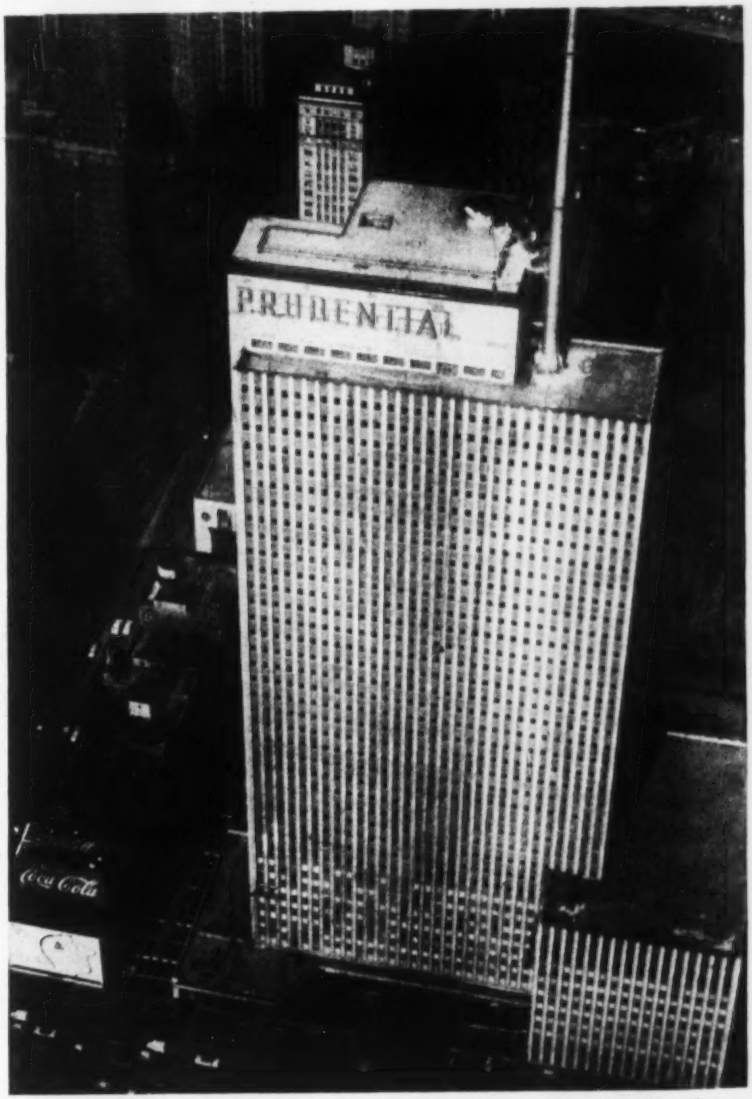
U.S., and in Canada, lift-slab buildings six stories high were erected, setting new height records. Seven slabs, for the six floors and roof of each building, were concreted on the ground and raised to their final positions by jacks atop the columns. Two lifts were employed, four of the slabs being stacked halfway up until the columns were extended the full height (ENR April 28, 1955, p. 24, and Feb. 2, p. 43).

Also construction of a high school at Old Saybrook, Conn., demonstrated that lift-slabs need not be rectangular. Roofs of the one-story classroom buildings there are circular, 100 ft in diameter. The 10-in.-thick slabs are supported on two concentric rings of columns (ENR Nov. 10, 1955, p. 34).

Use of prestressed concrete also continued to expand last year, the greatest growth again being in production of pretensioned units, as fabricating plants sprang up all over the country. An intriguing development was the introduction of a German machine that produces concrete planks like toothpaste being squeezed out of a tube. A gantry crane carrying a casting machine with slip form straddles the casting beds. (A no-slump concrete is used, eliminating the need for side forms.) Tensioned wires are stretched in the bed between anchorages. As the casting machine moves down the bed, extruding concrete, it automatically shapes out tongue-and-groove edges, vibrates and tamps the material, accurately positions the tendons and finally screeds and trowels the top surface. After the prestress is transferred from the wires, the plank is cut into desired lengths (ENR Nov. 24, 1955, p. 40).

In view of the rapid growth of the prestressing industry, it is not surprising that an organization was formed to promote its interests. Last year, the Prestressed Concrete Institute held its first annual meeting. At year's end, it reported it had grown from eight Florida members to 50 from 20 states and three foreign countries.

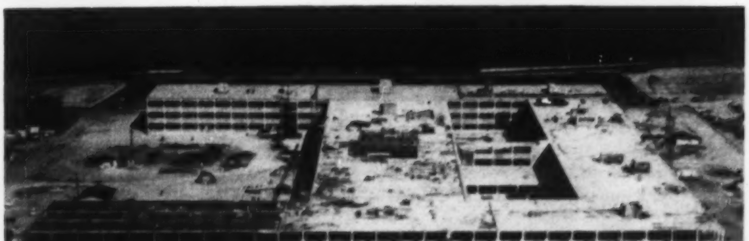


OFFICE BUILDING set a record last year, with huge skyscrapers, such as the 41-story Prudential Building in Chicago (above), playing a major role.

A trend toward greater use of hung-span construction also was evident last year. A good example is the hangar approaching completion at Kelly Air Force Base, San Antonio, Texas. Not only are the purlins of this type of construction, but the roof trusses are also. Hung spans offer many of the advantages of continuous members, without some of the disadvantages.

Many examples of space-frame construction—both in steel and concrete—came to the fore in 1955. For example, structural steel requirements were reduced for the gable roof of an 80x94-ft high school gymnasium, by placing arches in the sloping roof planes with crowns in contact. Thrust from the rafters is transmitted by the arches to the ends of the building, where it is carried to the ground. Half uniform roof load is accounted for this way; other half is taken by exterior walls (ENR March 24, 1955, p. 35).

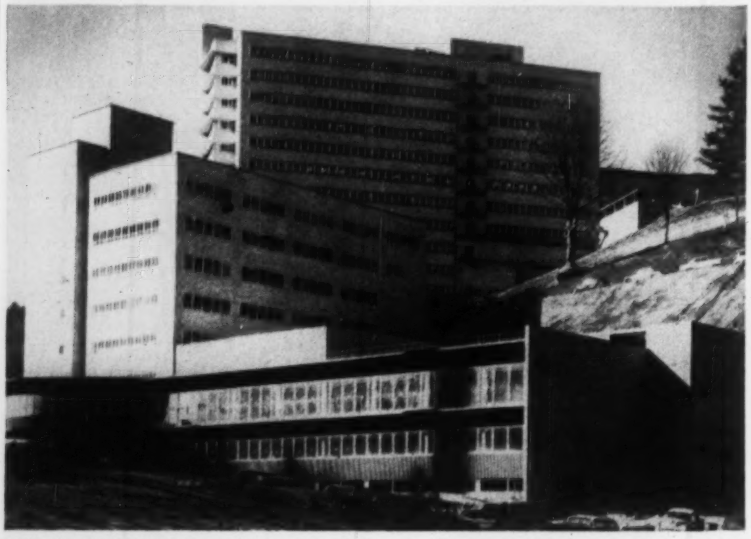
Another example is an 85x65-ft school with column-free interior made possible by a space truss of light-gage steel. As described in a research re-



HUGE FLAT-SLAB BUILDING will be $20 million headquarters for the National Security Agency at Fort Meade, Md.

Beverly Hilton

HILTON HOTEL in Beverly Hills, Calif., offers window walls and private balconies with most of its 450 rooms. The Y-shape building is of reinforced concrete construction.



MEDICAL SCHOOL at University of Oregon, Portland, added a dental laboratory and 14-story, 277-bed teaching hospital.

port, ". . . the members form the edges of alternating erect and inverted pentahedrons (square pyramids) whose bases create two parallel planes and whose sides create a series of tetrahedrons (triangular pyramids), which interlock with the pentahedrons." More simply, standardized components are bolted together to form trusses that span the building in two directions (ENR Jan. 12, p. 23).

Perhaps more spectacular are several examples of folded-plate reinforced concrete construction. Continuous thin slabs are formed into corrugated or serrated surfaces that, in effect, span between supports in one direction as beams and in the other as self-supporting arches or rigid frames.

An outstanding application is in a huge airframe overhaul building on which construction started late last year for Trans World Airlines (ENR Jan. 26, p. 44). Corrugated shells varying from 3½-in. to 7 in. in thickness span 150 ft in the roof. Similar slabs 3½ and 4 in. thick in floors span 50 ft.

• Innovations—This hangar is also of interest for another reason. Its roof, projecting 150 ft on two sides of a central office-and-shop section, is supported on cables anchored in walls atop the central section. This construction makes possible 130,880 sq ft of column-free space in each of the two main bays and door openings 540 ft in the building's 816-ft sides. At least two more suspension-roof hangars are under way at present, indicating that a trend toward this type of construction may be starting.

Meanwhile, a strong trend developed last year in the Northwest to thin-shell, concrete arch construction (ENR Jan. 14, p. 35). It is too early, however, to be able to predict whether the trend will spread to other regions, or even whether it will continue as strongly in the Northwest.

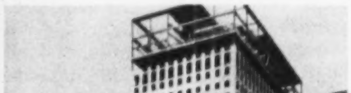
In the search for lower-cost construction, a trend also appeared in 1955 to use of materials that can serve several purposes. For example, in roof construction, preference is being given to products that can serve as a form for concrete or gypsum, thermal insulation and acoustic insulation. Another example is a product introduced last year that is making headway in both floor and roof construction; of corrugated light-gage steel, it is used as both form and reinforcing for concrete.

Plastics continued to gain ground in building construction last year. One of the most significant innovations was the use of foamed plastics in the form of boards in house construction (ENR Aug. 11, 1955, p. 101). Excellent as insulation, the boards are very light, making it possible to build a wall swiftly.

Another innovation last year was erection of a full-scale mockup of a part of a proposed building to try out different materials and equipment (ENR Oct. 20, 1955, p. 50). The experiment proved well worth the cost to the owner in many ways, and as a result, it may be copied in the future.

A new application of stud welding

(Continued on page 96)



SOCONY MOBIL BUILDING in New York was enclosed with story-high stainless steel panels.

Welded design saves 12% on steel for hospital addition

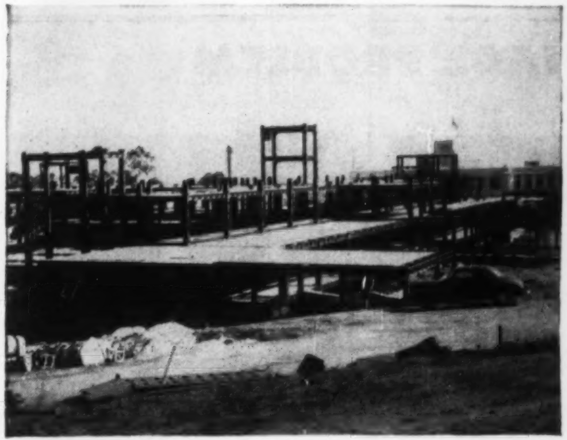


Fig. 1. *Framework for San Mateo County Community Hospital showing overall steel work and some of the preformed metal decking.*

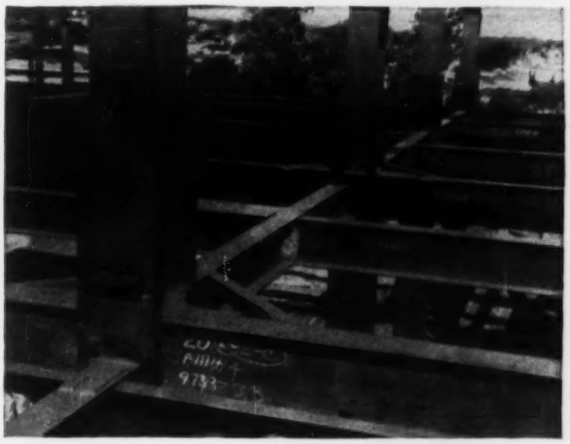


Fig. 2. *Close-up of an off-center beams-to-column connection. Use of welding on this project results in extremely simple and clean design.*

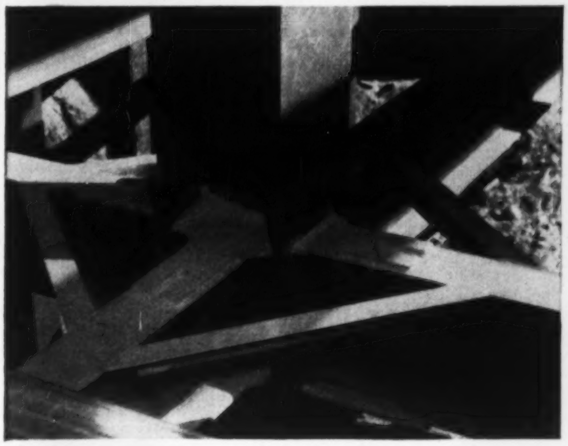


Fig. 3. *Slotted cover plates used to provide necessary amount of welding required by the seismic and other lateral moments.*

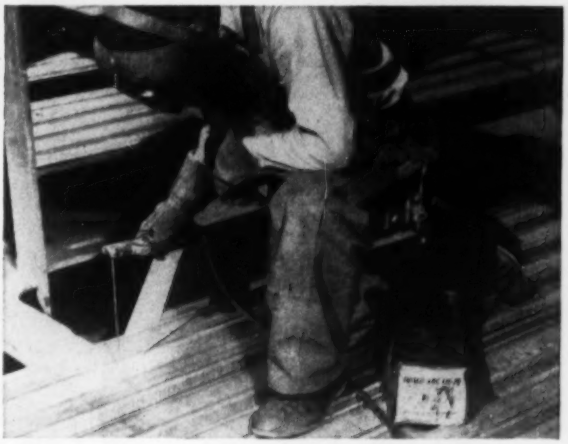


Fig. 4. *Plug welding preformed metal decking being used in the construction of the San Mateo County Community Hospital with low-hydrogen electrodes Lincoln Shield-Arc LH-70. Welded metal decking acts as a diaphragm to give additional resistance to seismic shock.*

A 12% reduction in steel is estimated on the 1200 ton frame-work addition to the County Community Hospital, San Mateo, California.

One of the California Bay area's largest all-welded structures, the framework features beam-to-column connections of unusual design. Developed for heavy lateral loading to withstand earthquake forces, the rigid frame design utilizes slotted cover plates and angle bracing in beam-to-column connections.

Although some beam-to-column connections are well off center (Fig. 2), they can be made clean and simple by welding which would have been difficult by any other method.

The welded design exemplifies the added strength and reliability of welding to withstand extreme stresses over and above those encountered in conventional buildings.

Architects: Stone, Mulloy, Marraccini and Patterson;

Structural Engineers: George Washington & Associates;

General Contractors: Robert E. McKee, Inc., Los Angeles.

Studies in Structural Arc Welding available to architects and engineers by writing Dept. 2311.

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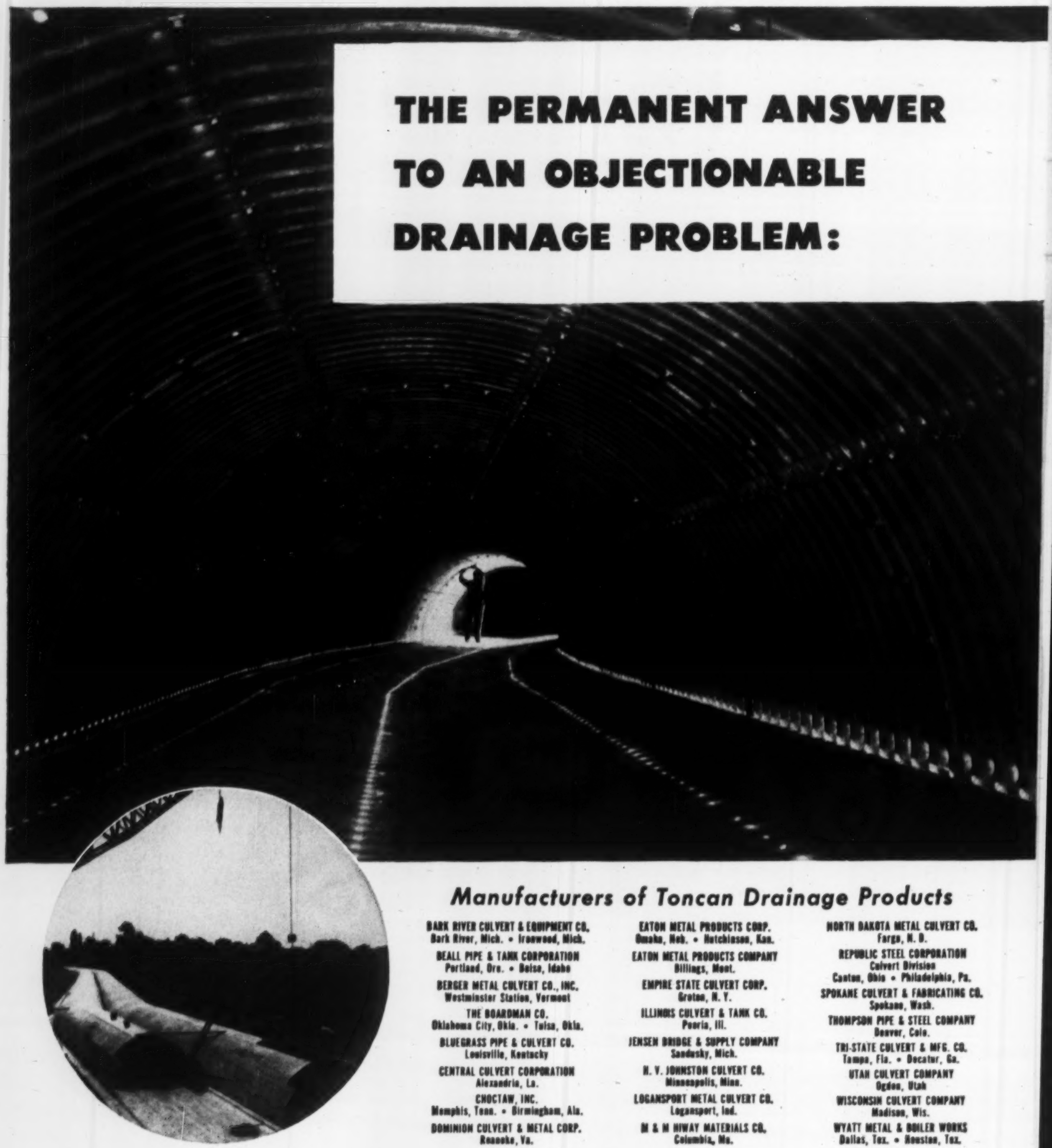

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When Big Creek in western Cleveland became contaminated and objectionable due to community expansion, protection of both health and property value demanded its permanent enclosure. In addition, the drainage structure needed would be called on to handle occasional heavy run-offs but could not exceed practical headroom limits.

To meet all requirements, twin Toncan® Iron Sectional Plate Arches with vitrified pavements were selected. Each provided a 12-foot, 6-inch span with only a 6-foot, 5½-inch rise. Each was 1677 feet long.

Of particular interest in the Big Creek enclosure was the use of salvaged Republic Sectional Plates. While the first 927 feet of each structure used new 8-gage plates, the remaining 750 feet were constructed of 900 3-gage plates, removed when an earlier job was enlarged. *These Toncan Iron Sectional Plates, which had been in underground service for 19 years, were still in excellent condition.* Speaking of the entire job, the erection superintendent said, "The fabrication was perfect."

Republic, and the drainage products manufacturers listed on the opposite page, offer a complete line of drainage products designed to give long-lasting service under all conditions. Resilient and flexible, they won't crack, crumble or spall . . . and are unaffected by impact, vibration or shifting fill. Various types include Corrugated Metal Pipe, Perforated Corrugated Metal Pipe, Sectional Plate Pipe, Corrugated Metal Pipe Arch, Sectional Plate Pipe Arch and Sectional Plate Arch . . . available in Toncan Iron and Republic Copper Steel.

Contact the Drainage Products Manufacturer nearest you for complete information. Or mail the coupon.

ECONOMY AND DURABILITY are key features of this Corrugated Metal Pipe Arch bridge which allows street to cross drainage arroyo—serving a large area. By using three parallel pipe arches, each with a 72-inch span and 44-inch rise, the city was able to handle the necessary volume within very low headroom. Cost was a fraction of that required for a steel and concrete structure.

FOR MAXIMUM SERVICE in heavy-duty handling operations, like the railroad car repair shop use shown here, insist on Republic Chain Products. As a basic steel producer, Republic controls quality from ore to finished product, assuring long-term dependability. Whatever your problem; hauling, hoisting, holding or towing, your Republic Chain Distributor can furnish the chain and accessories required.

LONG-LASTING, TROUBLE-FREE performance is yours when you use Republic Flexible Plastic Pipe to bring in construction water . . . or drain flooded excavations. Made of tough polyethylene, it resists abrasion and the effects of acids and alkalies. In addition, it is immune to electrolytic action. Lightweight and easy to cut or join, it can be used on job after job. For literature, mail coupon.

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☐ Chain Products ☐ Republic Plastic Pipe

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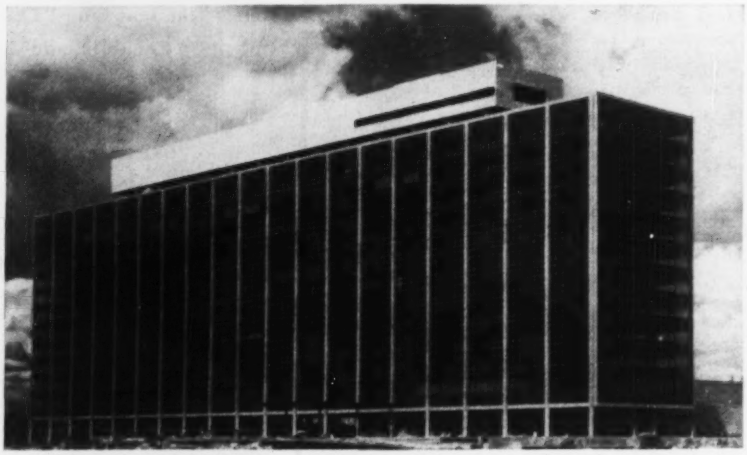
SHARPSTOWN, TEXAS, being built from scratch, ended its first year with 875 houses. Sites are sold to builders.



CENTRAL STAFF BUILDING for Ford Motor Co., Dearborn, Mich., was walled with porcelain-enameled steel panels with two insulating cores.

may give a boost to composite construction, in which concrete slabs participate with steel beams in carrying loads. The studs are welded to the top flange of the beams to transmit shear between the two materials. Other methods, such as welding spiral wires or vertical plates to the flange, have been used successfully, but attachment of the studs with a welding gun is claimed to make the new method of shear transfer more economical than the others.

• **Trend in air conditioning**—In areas where steam is relatively cheap, absorption-type units are frequently more economical for air conditioning than centrifugal compressors operated by electricity. As was demonstrated last year, however, sometimes the different-type units can be used more economically in tandem. The centrifugal machine is driven by a steam turbine, and back-pressure steam from the turbine energizes an absorption unit.

Also, a trend appeared to be developing last year toward rooftop locations for the refrigerating units. Behind the shift from basement to roof lies this reasoning: The machines usually require a rooftop cooling tower to save water, and if they are placed in the basement, piping must be run through the building to the tower on the roof, taking up space and adding to construction costs. Or if an absorption unit and boiler are specified, a basement location occupies space that could be used more profitably for other purposes, and a boiler stack has to be extended to the roof. Improvements in equipment design, almost completely eliminating vibration, make roof installations feasible. The next step should be a trend to lighter units.

Major Building Projects

• **U. S. Air Force**—The largest single-story warehouse in the world was completed at Palmdale, Calif. The aluminum-faced structure is 500 ft wide by 1,000 ft long. The first of four such warehouses, it has a structural steel frame and a dehumidified interior.

• **Tennessee Valley Authority**—By the end of 1954, TVA had built three major steam plants—Watts Bar, Johnsonville and Widows Creek. Two more—Kingston and Colbert—were completed last year, and the three still under construction—Shawnee, John Sevier and Gallatin—are expected to be in full operation this year.

At Kingston, placing of five 200,000-kw units on the line in 1955 brought this plant to its ultimate capability of 1,600,000 kw, making it the world's largest steam-electric generating station. Estimated cost of this gigantic plant on Watts Bar Lake, 40 miles southwest of Knoxville, Tenn., is $199.5 million.

The Colbert plant, on Pickwick Lake, 12 miles southwest of Wilson Dam, Ala., was brought to completion with installation of four 200,000-kw units. Estimated cost is $104 million.

Substantially completed, the Shawnee plant, on the Ohio River, 12 miles downstream from Paducah, Ky., will be second in size to Kingston. The eighth and ninth of its ultimate ten units, of 150,000-kw each, were placed in service last year. Estimated cost is $216 million.

Two of the three 200,000-kw units at John Sevier plant went into operation last year; the third is scheduled for next month. Built on the Holston River, 60 miles northeast of Knoxville, Tenn., the plant will cost $87.5 million.

The two-unit, $81.5 million Gallatin plant, on the Cumberland River, 25 miles northeast of Nashville, Tenn., will be completed this year. The units, each of 250,000 kw, will be largest in the TVA system.

• **National Security Agency**—Structural concrete work has been completed for the $20 million air-conditioned office building at Fort George G. Meade, Md. Insulated, precast concrete panels with exposed green stone aggregate are being placed to form the exterior walls.

• **Southland Center**—Construction started in December on this $40 million project in Dallas, Texas, consisting of a three-story block-square base above which three towers will rise. One is a 42-story home office building for Southland Life Insurance Co. The second is a 28-story, 600-room hotel for Sheraton Corporation of America. The third tower still is in the proposed stage. A five-level, 2,000-car underground garage,

because it's fireproof, weatherproof, needs no maintenance

To withstand the severe climate changes in Barre, Vermont, the Rock of Ages Corporation turned to Ruberoid Corrugated Asbestos for exterior siding in their modern, new plant. Resistant to acids, fumes, smoke and steam, Ruberoid Corrugated assures long life for any plant need. It is noncorrosive . . . fireproof . . . eliminates expensive painting maintenance . . . assures lower construction costs. Installation on skeleton frame construction means less expensive footings and framing. For roofing, siding or indoor partitioning, Ruberoid Corrugated Asbestos saves time and expense in construction, keeps maintenance at a minimum year after year.

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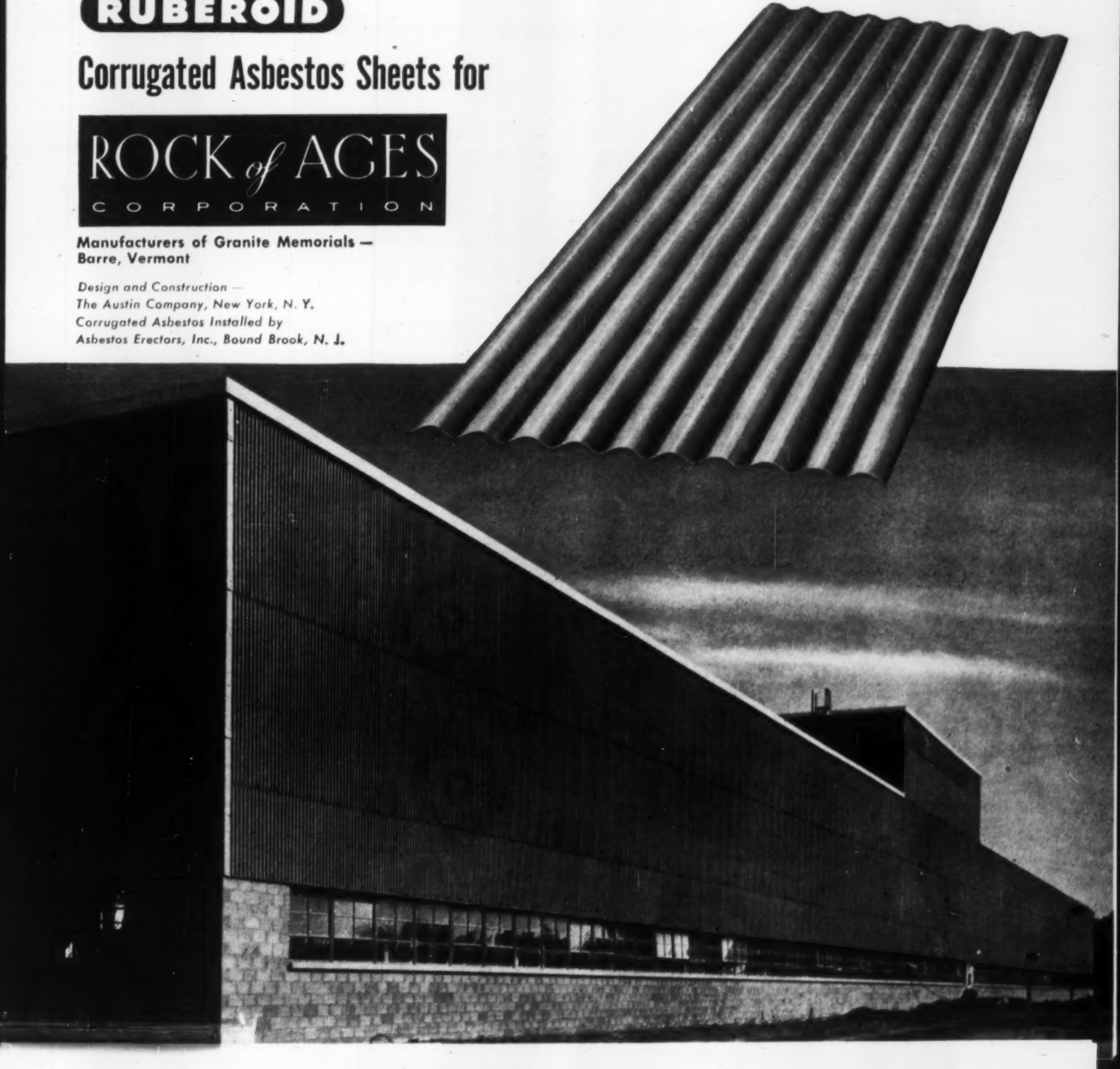

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plus 175,000 sq ft of retail store area, also are included in the project.

• **Rogers High School**—A thin-shell concrete dome spanning 160 ft will roof the auditorium of this $2.5 million Newport, R. I., school. Other building units include a field house, dining hall, three vocational wings, a home management building, science and mathematics wing, library and academic-classroom wing, and a building for business education rooms and school offices. Construction is about 25% completed.

• **N. Y. Stock Exchange**—The 27-story air-conditioned annex for the New York Stock Exchange, known as 20 Broad St., is scheduled for completion later this year. Of steel-frame construction, it will have a rentable area of 500,000 sq ft and a granite, brick and aluminum exterior. One-story-high trusses support columns for upper stories over a 3-story column-free extension of the exchange trading floor.

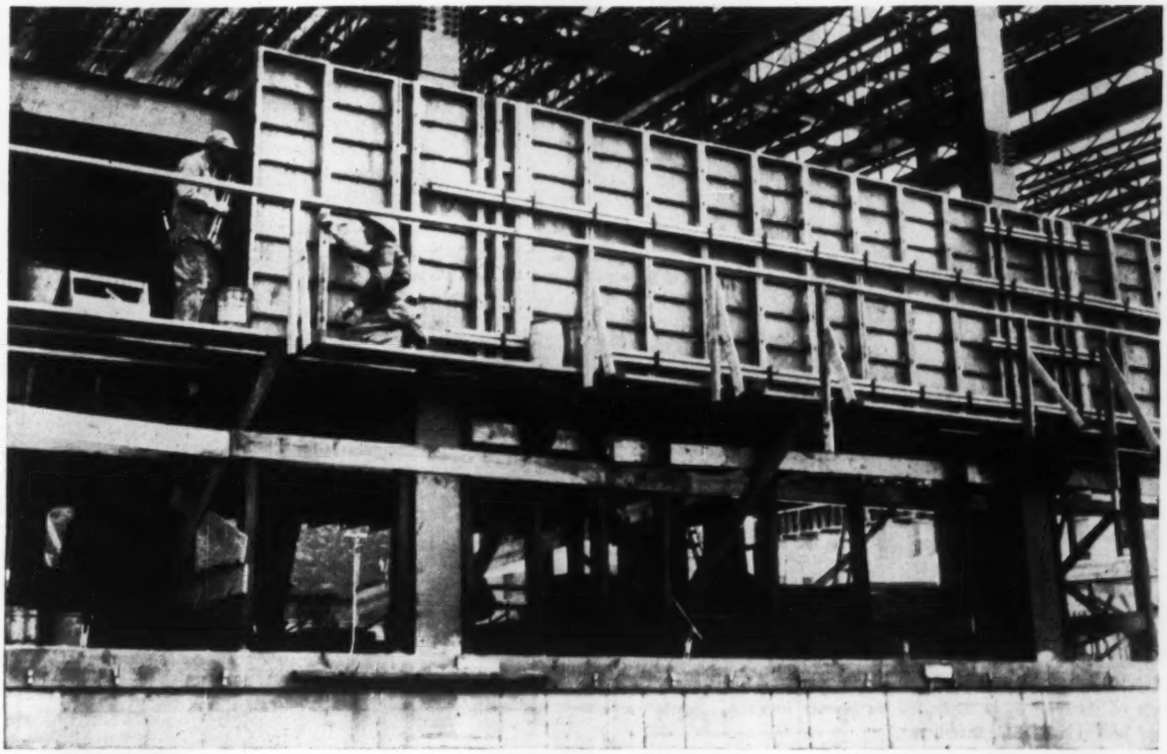
• **New York Coliseum**—The $35 million project, composed of a four-level exhibition hall, 20-story office building and 850-car parking garage, will be ready this spring. Only two years were required for design and construction. Exhibition and office areas are air conditioned.

• **New York City Housing Authority**—Completed in 1955: Red Hook Extension, Van Dyke, Brevoort, Bronxdale, Cypress Hills and Hammel Houses—five projects containing 6,498 apartments in 95 buildings—at a cost of $80.2 million. Still underway: Washington, Jefferson, Carver, Forest, Baruch, LaGuardia, Bayview, Summer, Grant, Coney Island, Howard, Wagner, Marlboro, Albany Extension and Linden Houses—containing 29,805 apartments in 208 buildings—at a cost of $304 million.

• **Mobay Chemical Co.**—A $12 million plant for production of raw materials for foamed-in-place plastics—first of its type in the U. S.—was completed in November at New Martinsville, Va., less than one year from start of construction.

• **Penn Center**—This project, in the heart of Philadelphia, Pa., continued to expand last year. A 20-story office building was completed, and steel was erected for a 20-story Sheraton Hotel. Also, an underground concourse and shopping center was constructed. Excavation started for a 20-story Transportation Center, with a five-level underground parking garage and a bus terminal.

• **Westinghouse Electric Corp.**—A plant for manufacturing semi-conductor devices, such as transistors, power rectifiers, high-frequency detectors and photocells, has been completed at Youngwood, Pa. The



Symons Forms being used for forming Spandrel Beams up to 8½ feet on the Minnesota Mutual Life Insurance building. 9,000 square feet of Symons Forms were reused 12 times on this job. Symons Shores are also visible below. William Baumeister Construction Co., St. Paul, general contractor.

Contractor Cuts Two-Thirds off Forming Costs of Spandrel Beams with Symons Forms

Because of the efficient combination of Symons forming, shoring and scaffolding methods, the contractor was able to cut his estimated cost by two-thirds on the $2,000,000 home office building of the Minnesota Mutual Life Insurance Company of St. Paul, Minnesota.

In addition to savings in labor cost, considerable time was saved in forming the Spandrel Beams of this 9-story building. Sidewalk superintendents looking out of windows of the many surrounding office buildings could see real progress day after day. Forms were walked in place as efficiently as though they were on a footing on the ground. The adaptability of Symons Shores with their safe "T" heads speeded the forming and scaffolding work. The combination of forms, shores and scaffolding was the result of recommendations made by the Symons fieldmen.

All foundation walls are 16 feet in height. Note the use of only three walers.

This is the second of the big, new life insurance structures in the Twin Cities using Symons Forms for the concrete construction. It is the first of its size in St. Paul using a structural steel skeleton with standard and clear span joists, with its decking of corrugated steel sheeting covered by concrete. 2 x 8 ft. Symons Steel Rib Forms were used to frame 56,000 square feet of spandrel beams. Symons Shores were used throughout in beam construction. All foundation walls are 16 feet in height.

Symons Engineering and Customer Service also played an important role in this project. The Symons Engineering Staff furnished complete form layouts and job cost sheets on the form work—at no charge to the contractor. This service enabled the contractor to get a clear picture of his job (its cost, bill of materials and labor saving methods). Symons fieldmen gave regular on-the-job service. First, by on-the-job recommendations of forms and hardware needed. Second, by showing the workmen how to set up the forms efficiently. Third, by being available and giving service on last minute requirements.

View of a spandrel beam after Symons Forms have been removed.

Symons Forms, Shores and Column Clamps can be rented with purchase option. All rental charges apply on the purchase price, during a 60-day period.

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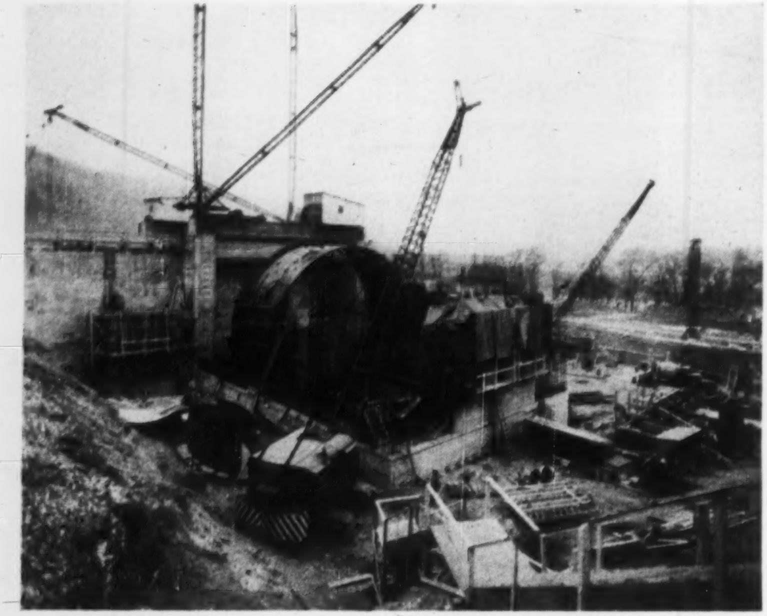


NUCLEAR POWER PLANT for Duquesne Light Co. at Shippingport, Pa., will be first of its type to be operated by private industry. Foundations now are completed and boilers are being installed.

420x240-ft manufacturing area will be air conditioned, the humidity being closely controlled. The brick and concrete-block exterior walls will be windowless, to meet cleanliness and air-conditioning requirements. The shipping, receiving and warehousing area is 240x105 ft, and the two-story office section 48x280 ft.

• **Prudential Building**—The $40 million, 41-story office building over the tracks of the Illinois Central R.R. in Chicago has been completed. Fully air conditioned, it has a limestone exterior with brick backup, aluminum spandrels with concrete-block backup and vertically pivoted, rubber-gasketed aluminum windows with double glazing. Elevators have a top speed of 1,400 fpm, fastest installed to date.

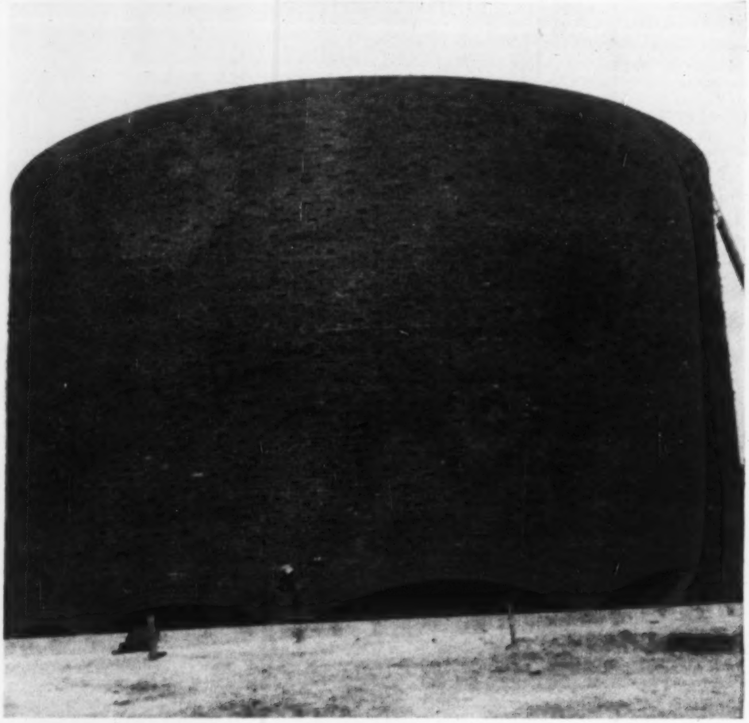
• **Trans World Airlines**—Foundations were being prepared at year's end for an $8 million, 820-ft long, airframe overhaul building at Kansas City, Mo., with 130,880 sq ft of column-free space in each of its two main bays. A folded-plate, reinforced concrete roof projecting 150 ft over each bay will be suspended from cables, to eliminate columns. The cables will be anchored in concrete anchor walls atop the three-story, 100-ft-wide, central section of the building, which will contain shops and offices. The second and third floors of this section also will be of folded-plate concrete construction and will be hung from the anchor walls.

• **Lambert-St. Louis Field**—The $4.5 million terminal building with an unusual roof was completed at the St. Louis, Mo., municipal airport. The roof is composed of three units, each consisting of two intersecting, thin-shell reinforced concrete barrel arches, which have a span of 120 ft and a rise of 32 ft. The shells are 4½ in. thick. The three-level concrete building is enclosed with glass on the field side and brick on the opposite side. It is now 438 ft long, but eventually it may be double that length.

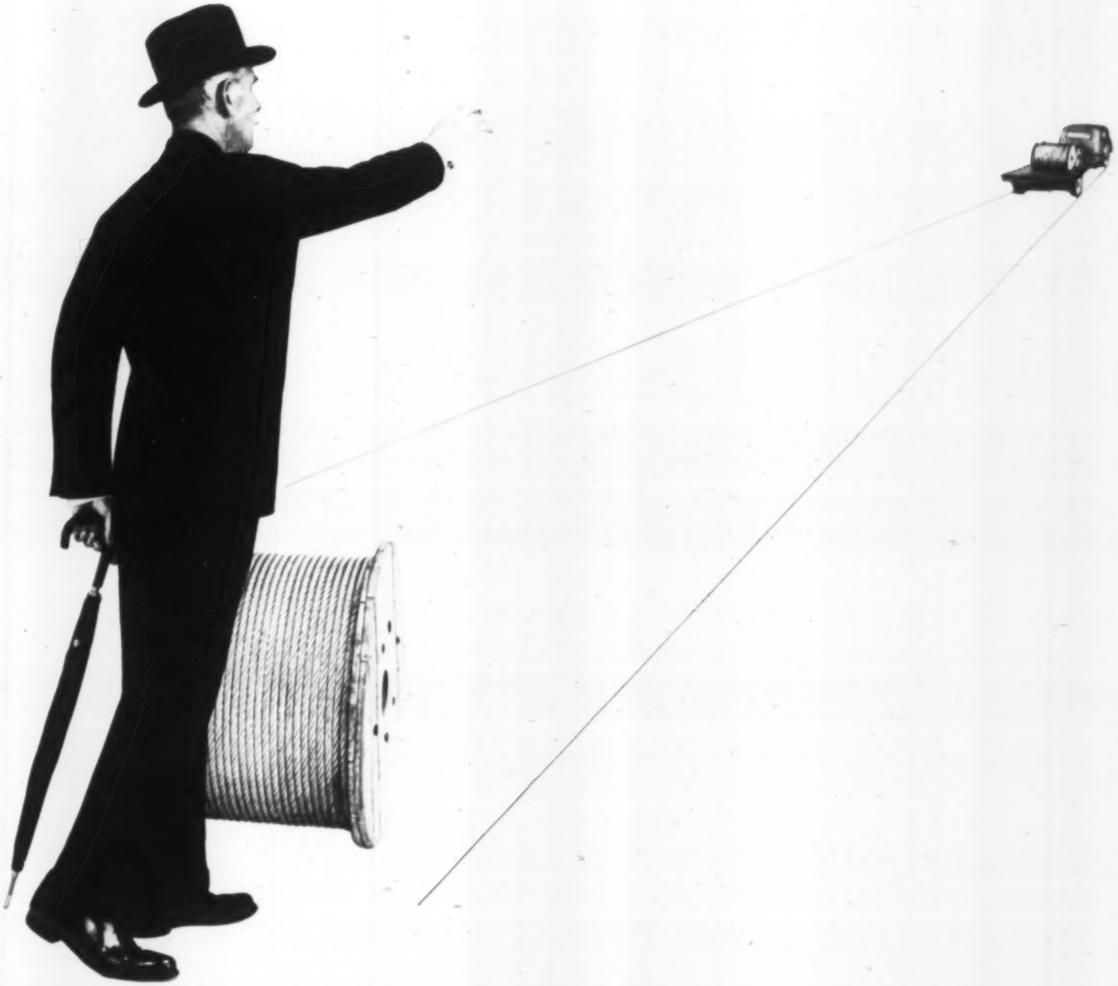
• **International Business Machines Corp.**—Research building at Poughkeepsie, N. Y., nearly completed, consists of two two-story buildings connected by a 36x12-ft passageway. Both are air conditioned, humidity being closely controlled. One building is 289x74 ft, the other, 110x217 ft. Second-floor framing is composite construction, with studs welded to the top flanges of steel beams to transmit shear to the concrete floor slab. Exterior walls are porcelain-enameled steel panels in aluminum frames, with 2-in. cellular-glass insulation.

• **Park City**—First section of a housing project completed in Queens, N. Y., consists of six 14-story buildings, of eighteen planned. Outside corridors providing access to apartments have panel-heating coils embedded in the floor slab.

• **Socony Mobil Building**—Now about 75% complete, this 45-story skyscraper in New York City will be the world's sixth largest building in floor area. Containing 1,600,000 sq ft, it will be the biggest com-



CYLINDRICAL CHAPEL of brick at Massachusetts Institute of Technology, completed last year, is 54 ft in diameter, 33 ft high, seats 126.



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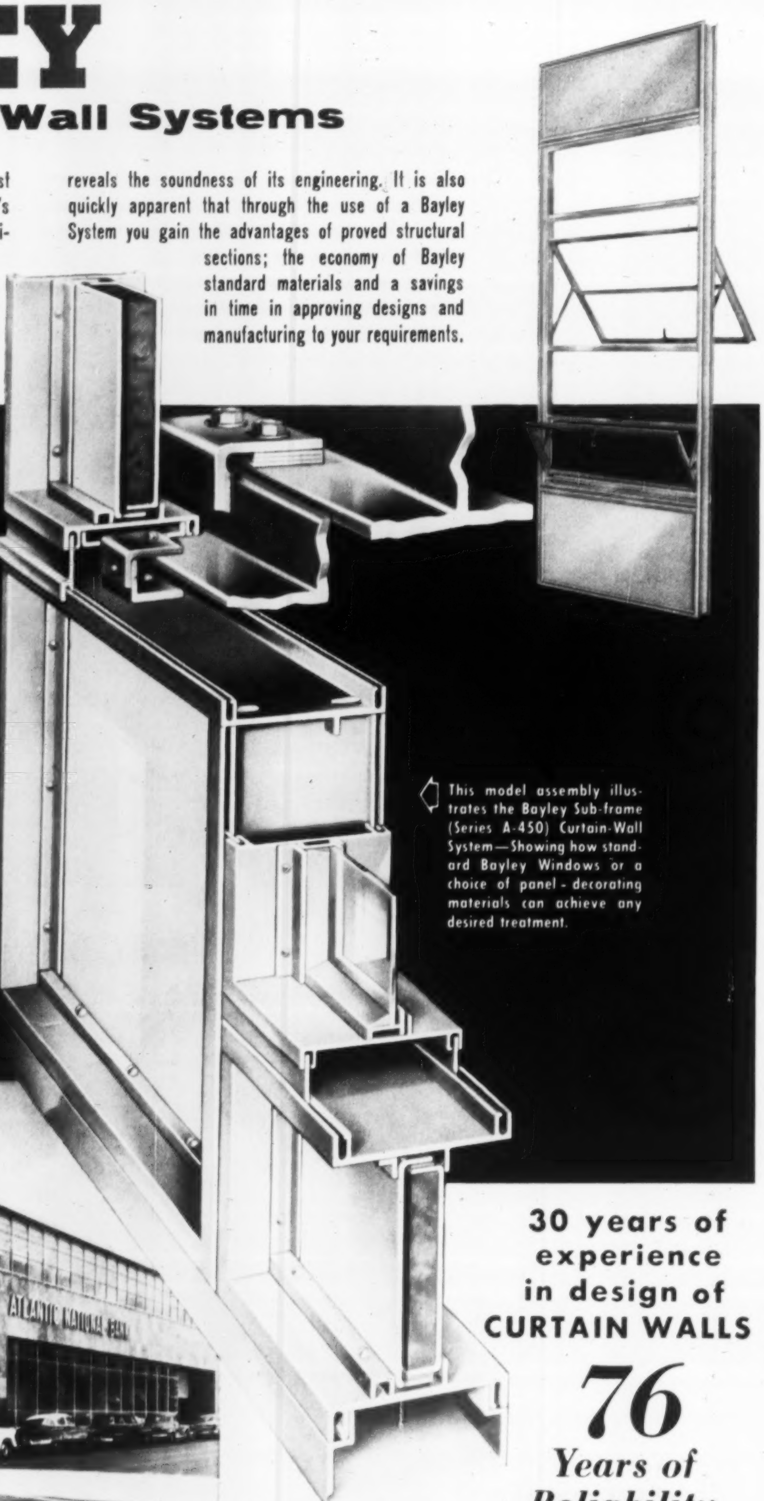
The Bayley Curtain-Wall System represents the latest advance in fundamental designing, based on Bayley's 30 years of performance-proved experience in engineering curtain-wall installations. It offers versatility of application that affords you wide latitude of building design with the economy of standard details. A thorough study of the illustration below reveals the soundness of its engineering. It is also quickly apparent that through the use of a Bayley System you gain the advantages of proved structural sections; the economy of Bayley standard materials and a savings in time in approving designs and manufacturing to your requirements.



With Bayley's sub-frame designs you can achieve distinctive individualized curtain wall treatments of almost unlimited variety without the costliness of special window designing. Standard Bayley Aluminum Projected Windows, with heavy channel frames and a choice of ventilator arrangements, serve as the basic unit — and at the same time afford the maximum in air, light and vision. Combining versatility of application with standard details and sections, Bayley can help you accomplish some surprising and exciting things.

If consulted in the early stages of your project, giving Bayley an opportunity to properly pre-engineer your job you will be assured of maximum ultimate satisfaction in both design appearance and integral building construction.

⇦ This model assembly illustrates the Bayley Sub-frame (Series A-450) Curtain-Wall System—Showing how standard Bayley Windows or a choice of panel-decorating materials can achieve any desired treatment.

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MARBLE-WALLED SKYSCRAPER in Detroit Civic Center is the City-County Building housing 40 departments and 37 courtrooms. It is 20 stories high.

mercial structure to be fully air conditioned initially. It also will be the world's largest metal-clad office building, the exterior requiring 400,000 sq ft of stainless steel. Completion of the $45 million project is expected this spring.

• **Connecticut General Life Insurance Co.**—The home-office building in Bloomfield, Conn., 470x327 ft in plan, with four interior courts, and three stories high, is now 50% completed. The glass-walled, steel-framed structure will be air conditioned. Its design was not finalized until a full-size mockup had been erected and various combinations of materials and fixtures tried.

• **Duquesne Light Co.**—Work started last year on the first full-scale nuclear-energy power plant in the U. S. At Shippingport, Pa. More than 250,000 cu yd of earth were moved for the plant, and 25,000 cu yd of concrete, of an ultimate 50,000 cu yd were placed. When completed in 1957, the reactor will produce at least 60,000 kw, and the plant's turbo-generator will have a maximum capability of 100,000 kw.

• **Campbell Soup Co.**—Plant to be completed this year at Napoleon, Ohio, has a floor area of about 900,000 sq ft. Buildings include a complete food-processing operation and a cold-storage warehouse, of reinforced concrete, and offices, tomato-processing facilities, laboratory, cafeteria, can-making plant and boiler house, with steel framing.

• **Belleville Memorial Hospital**—Construction started late in 1955 on a $1.9 million general voluntary hospital at Belleville, Ill., with a very efficient floor plan. Consisting of one and two-story elements, plus basement, the layout places more than half the patients on the same floor as the diagnostic and therapeutic services, which are grouped to facilitate cooperation of surgeon, radiologist, pathologist, physical therapist and record librarian. Present construction will have a capacity of 86 beds, of 154 planned.

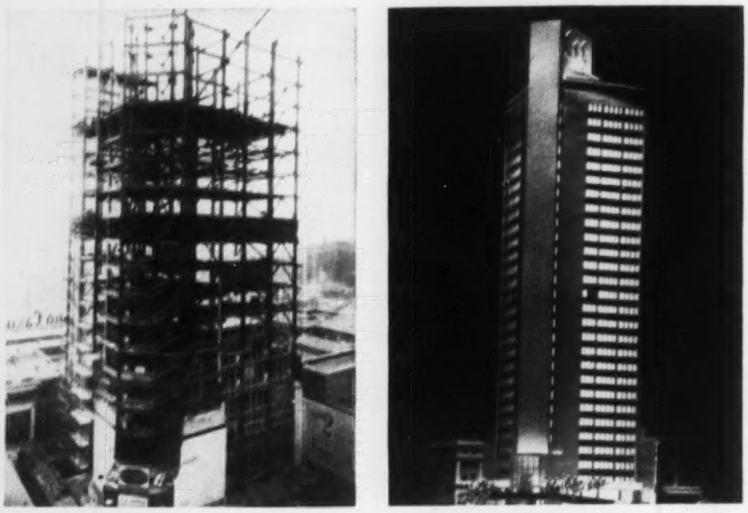
• **Ford Motor Co.**—Two major plants scheduled for completion this year are a 1,500,000-sq ft metal stamping plant near Chicago, and a 1,750,000-sq ft chassis parts manufacturing plant north of Detroit. The stamping plant, located on a 140-acre site, will contain 16 major press lines. The L-shaped chassis-parts plant will measure 1,750 ft in depth and 1,060 ft across the front. Other facilities include a two-story administration building, parking facilities for 5,000 cars, auxiliary power house, water storage and pumping equipment, hospital, cafeteria and locker rooms. Ford's new 12-story office building at Dearborn, Mich., containing nearly 1,000,000 sq ft of floor area, for 3,000 employees, will be completed by mid-1956. Its exterior is a combination of porcelain-glazed steel panels and tinted, heat-absorbing glass. Seven units have been completed in the company's new 750-acre Research and Engineering Center in Dearborn, under development since 1946. Three buildings now under construction will house body engineering, a cafeteria, and a scientific laboratory, while construction will start this spring on five new staff and product engineering buildings.

• **Detroit Civic Center**—Two major units in Detroit's Civic Center are scheduled for completion this year; a contract will be awarded this spring for construction of a third unit, and designs are being prepared for a fourth. Scheduled for completion by October is the $4.8 million Henry & Edsel Ford Auditorium, now 70% complete. Also scheduled for completion at that time is the $3.8 million, 725-car underground garage adjacent to the Ford Auditorium. Plans have been completed and initial contracts will be awarded early this year for foundation work for the Convention Hall and Exhibits Building, estimated to cost between $3 million and $4 million. Plans are also being prepared for a 400-car underground garage to be built in connection with the Convention-Exhibits Building, estimated to cost $1.2 million. Most of the demolition work has been completed for development of the Civic Center Plaza, as was a $775,000 contract for Section II of the Detroit River Bulkhead and $432,000 Pumping Station, which will provide raw water for air conditioning most buildings in the center. Development of the Civic Center also calls for relocation of Mariners' Church, at a cost of about $262,000, now underway.

• **Hilton Hotel**—The luxurious $16 million Beverly Hilton Hotel opened its doors in Aug., 1955, just three years after the project was initiated. The eight-story, reinforced concrete, Y-shaped building boasts private balconies for most of its 450 rooms, a 100,000-sq ft shopping center, and parking space for a thousand cars.

• **Los Angeles City Steam**—The Los Angeles Department of Water and Power continued to add to its $80 million Valley Steam Plant. Two more units totalling 312,000 kw generating power were completed during the year, and the fourth and final unit, expected to be in operation early in 1956, was well under way.

Though preliminary preparations were



STEEL-FRAMED TOWER in an office building for Life & Casualty Insurance Co., Nashville, Tenn., is 400 ft high, only 50 ft wide. Vertical trusses take the wind stresses.

accomplished for the department's Scattergood Steam Plant in El Segundo during 1955, construction on the first two 156,000-kw units will not be initiated until early 1956. Cost of the units will be $60 million.

And at the end of 1955 the department announced a new $250 million, five-year power construction program that includes the Scattergood plant.

• Los Angeles Civic Center—Construction got under way in Sept., 1955, on a new $19.5 million Los Angeles County Courthouse. Though progress has been slowed by the rock and gravel strike, initial steel work on the 7-story, 110-room courthouse began last month. Despite the difficulties, speedup planned in later stages of construction will probably mean little overall delay in schedules. The work has been slated for completion in 1957.

Completed in Sept., 1955, was a $6.5 million Police Administration Building. The eight-story reinforced concrete structure contains over 400,000 sq ft, and combines all aspects of the municipal police department under one roof, including jail facilities. Rigid sash windows have been installed throughout the building, and unbreakable glass partitions substitute in much of the jail area for solid walls or bars.

• Southern California Edison Steam—This electric utility has under way the largest current steam power construction program in the U. S. The work is included in $90 million spent for the system expansion and improvement in 1955. Budgeted for 1956 is $125 million of additional betterments.

The first $24 million unit of the $46 million El Segundo Steam Station, begun late in 1953, was completed and placed in operation in May, 1955. A second similar unit, started in 1954, was about 60% along at the end of the year, and is scheduled for operation around Sept., 1956. Each unit adds 175,000 kw to Edison's operating capacity. At the company's Redondo Beach Steam Station, construction of another generating unit, similar in design to the one at El Segundo, was authorized during the year, and is expected to be in operation in Sept., 1957. It will cost about $20 million and have a generating power of 175,000 kw. Work on the first $24 million, 175,000-kw unit at the Alamitos Steam Station near Long Beach was under way at the beginning of 1955, and will be completed late in 1956. A second, authorized during the year, should be finished in 1957.

• Superior Oil Co.—A 13-story office building in Los Angeles, on which construction began late in 1954, was delayed by the area's rock products strike, but completion is expected pretty close to schedule—by the end of 1956. It's an all-welded steel-frame tower structure, 115 ft square, extending 182 ft above street level.

• Tishman Office Buildings—A second office building project for Tishman Realty & Construction Co. on Los Angeles' famed Wilshire Blvd. was started in 1955. The steel work and flooring of the 13-story, $4 million structure was completed by the end of the year, and the aluminum panels, forming the east and west exteriors, were scheduled to be erected at the beginning of 1956. Expected to be finished in 1955, the Tishman building was a casualty of the Los Angeles rock and gravel strike, but should be ready by Spring of 1956.

A third $10-million twin-office building project will join the Tishman chain in 1956 and will probably be completed by year's end. The two 13-story buildings will be joined at the street floor in an arrangement similar to the first three-unit, $12 million office facility erected in Los Angeles by Tishman in 1952.

• Union Oil Building—Excavation work, started in August, for Union Oil Co.'s $20 million office center was practically completed by the end of 1955. The center will consist of one 13-story building, one three-story, and two two-story. Completion is scheduled for April, 1957. Structure is steel frame, with cellular steel decking covered with lightweight concrete fill. Foundations provide for additional stories on the smaller buildings, and another 13-story building down the center of the property, which occupies a full block.

• University of California Hospital—An $11 million hospital was completed in June, with the exception of the thirteenth floor. Final construction is now under way with additional funds, and completion is scheduled for 1956. A $4.7 million, 14-story medical science building was started late in 1955 and will be completed in 1957. A $2.9 million combination structure of two to five stories, also to be completed next year, will include interns' and nurses' quarters, a student union and parking facilities.

• Equitable Life Building—This steel-frame, 25-story San Francisco office building was completed in September. The $10 million structure has white marble facing on the first three floors, aluminum and stainless steel for windows, spandrels and mullions on the upper floors.

• Pacific Gas & Electric Co.—The first 165,000-kw unit of a $44 million steam plant at Morro Bay was completed in late summer. The second 165,000-kw unit is under construction, with completion scheduled for 1956. The plant will use sea water after it has passed through evaporators. Also scheduled for completion this year at Humboldt Bay is an $8.5 million steam plant of semi-outdoor design and 50,000-kw capacity. PG&E will start a $21 million steam plant at Station P in San Francisco during 1956. This unit, the fourth, will have a capacity of 165,000 kw.

• California State Buildings—A king-size program continues with $40 million of building projects expected to be ready for bid the first six month of 1956. And the 1956-57 fiscal-year budget is expected to include an additional $40 million. The biggest of the new projects will be additional cells at the Soledad State Prison. Ward buildings at the Metropolitan State Hospital will cost in the neighborhood of $5.5 million and at the Fairview State Hospital administration and hospital units will cost an equal sum. Other large new projects are: Sonoma State Hospital, six

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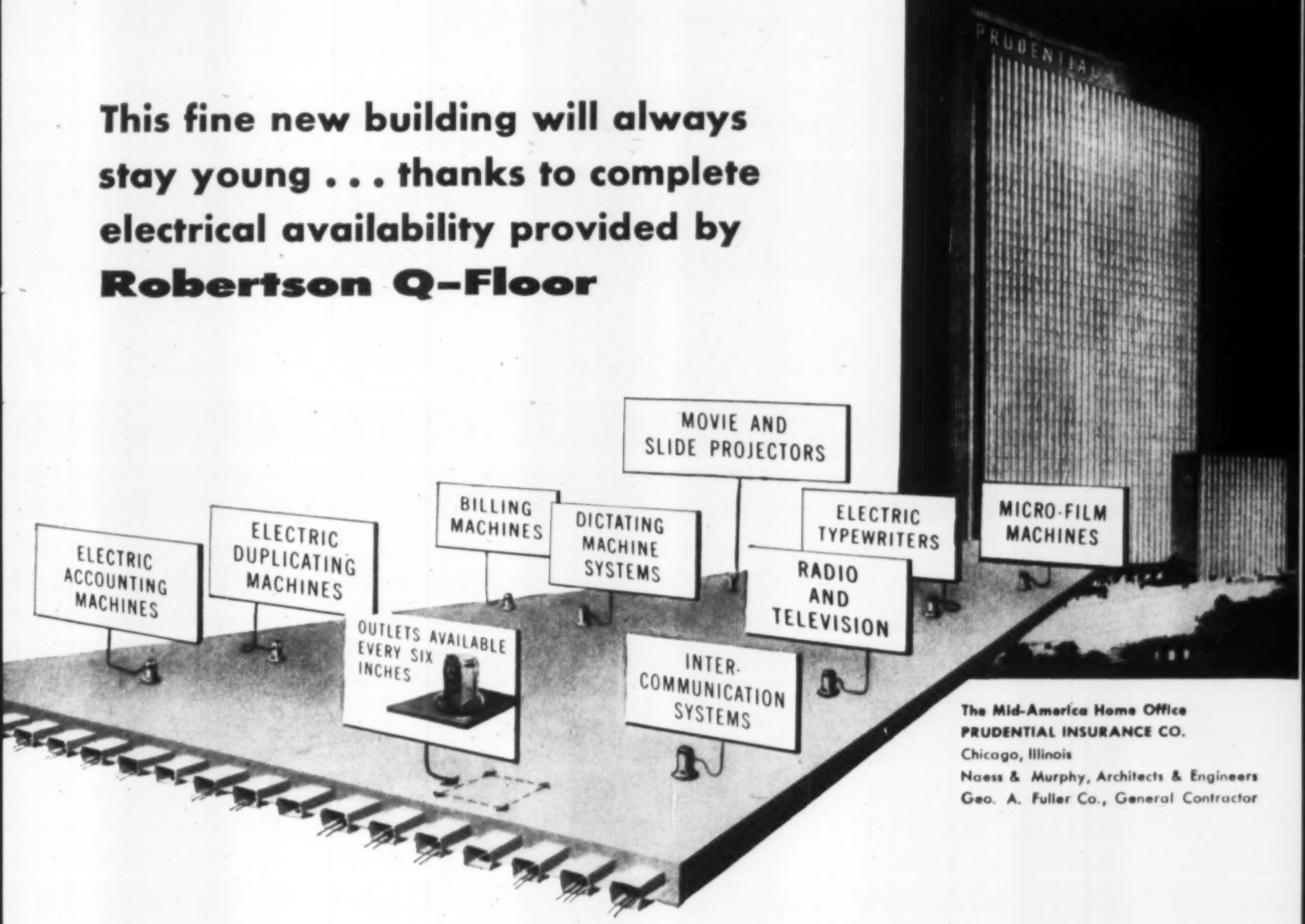
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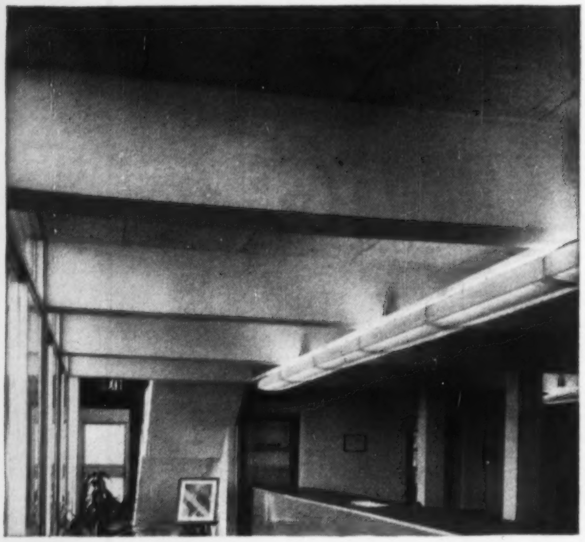

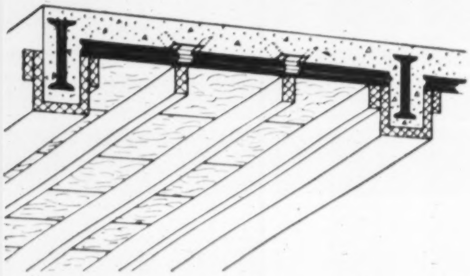

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ward buildings, $4 million; department of employment branch in Los Angeles, $3 million; San Francisco State office building, $7 million and San Jose State College science building, $2 million.

Meanwhile, work was completed on the $7 million department of employment building in Sacramento in time for occupancy in the first week of January. Construction of the $4.5 million commissary warehouse wing and seven similar cell block wings was completed at the Vacaville Medical Facility. Still under construction at the new department of corrections medical facility are an auditorium, chapels, maintenance shops and other therapy and service features and the reception guidance center. The institution is expected to be fully completed by the end of 1956.

• **University of Oregon Medical School**—A $5 million, 277-bed teaching hospital, towering 14 stories and a new dental lab and classroom structure, costing $2 million, were completed late 1955 in Portland.

• **Court House Square, Denver**—Excavations reached rock bottom in December, 11 months after they started, on this $30 million department store and hotel building project by Webb & Knapp, Inc. Bedrock is 55 ft below street level. Excavation will require moving 400,000 cu yd of earth, gravel and shale, of which 225,000 cu yd now has been moved. Four underground parking levels will be constructed in an area a block and a half square. On a block square area above, there will be a 7-story department store, and a 20-story hotel will be constructed on the adjoining half-block.

• **Life & Casualty Insurance Co.**—Steel has been topped out for this 30-story, $6 million, air-conditioned office building in Nashville, Tenn. Since the tower is only 50 ft wide, though 400 ft high, vertical trusses were incorporated in two exterior walls and on two sides of the elevator shafts to take wind forces. Cores 3 ft in diameter were drilled 25 ft into limestone to anchor the trusses. Above the 9th floor, where the tower starts, there are no interior columns; the tower is spanned by 50-ft rigid-frame, haunched girders. High-tensile bolts and semi-rigid connections are used throughout the steel frame.

• **Arnold Engineering Development Center**—About $10 million in new construction contracts are still to be awarded at the Air Force's $250 million research center, which is now 70% complete. Located at Tullahoma, Tenn., the project includes propulsion wind tunnels and other test chambers for evaluating jet engines, air frames and guided missiles through a wide range of conditions simulating actual flight.

• **Union Carbide and Carbon Corp.**—Silicone plant at Long Reach, W. Va., was 95% completed and in partial operation at year's end. Built on a 1,431-acre site, it includes 14 enclosed buildings with a total floor area of 110,000 sq ft, 9 outdoor-type structures with 90,000-sq ft working area and 9 outdoor storage-tank areas. Office and laboratory building is two-story, brick, 50x200 ft in plan, air conditioned and illuminated with luminous plastic ceiling.

• **Sharpstown, Texas**—Work started last March on this housing project, with country club and shopping facilities, which is planned to cover 6,500 acres. At year's end, 875 houses were either completed or under construction. Homesites are sold to builders, who construct and market houses conforming to the developer's standards.

• **Senate Office Building Addition**—A contract was awarded last September for this 7-story, $18 million, steel-framed structure in Washington, D. C. Air conditioned, it will contain offices, hearing rooms and committee rooms with facilities for radio and TV.

• **Kelly Air Force Base**—A $13 million structure, to be completed next month at San Antonio, Texas, will be the world's largest maintenance and repair hangar. It is 2,000 ft long, 300 ft wide and 91 ft high. An adjoining shop and administrative building is 1,650x250 ft. It is divided into five 400-ft bays, with 250-ft door openings. Clear spans are provided by 300-ft trussed rigid frames, which support 250-ft trusses, with 74-ft overhangs, spaced 36-ft c-c.

• **KRLD-TV and WFAA-TV Tower**—The tower carrying the antennas for these two TV stations in Dallas, Texas, is the second tallest structure in the world. Height is 1,521 ft. Triangular in section, the tower is 12 ft on each side. The legs, fabricated in 30-ft sections, are solid steel rounds varying in diameter from 10 to 4 in. Leg splice connections and main girt and diagonal connections were made with alloyed-steel drive bolts; all others, with standard machine bolts. Lock nuts and lock washers were provided for all bolts. Started last summer and completed in the fall, the tower is guyed in three directions, at five levels, with cables, 1¾ to 2 in. in diameter.

• **Pittsburgh Plate Glass Co.**—Approaching completion at Cumberland, Md., a $34 million plant for straight-line production of plate glass of precision optical quality extends for a distance of about ¾ mile. Buildings are of steel-frame construction, with builtup roofing and insulation on metal roof deck and insulated, corrugated asbestos-cement walls.

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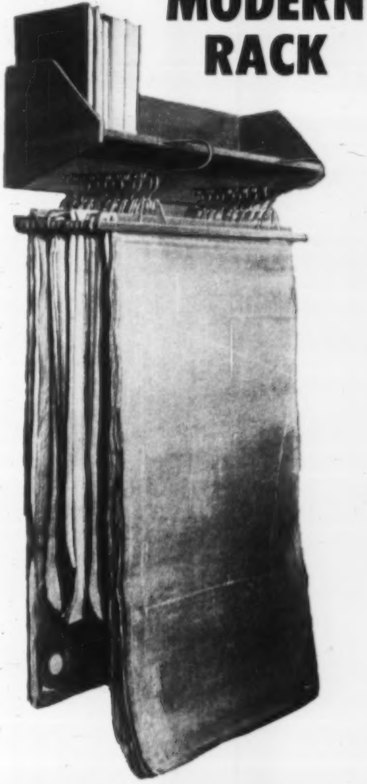

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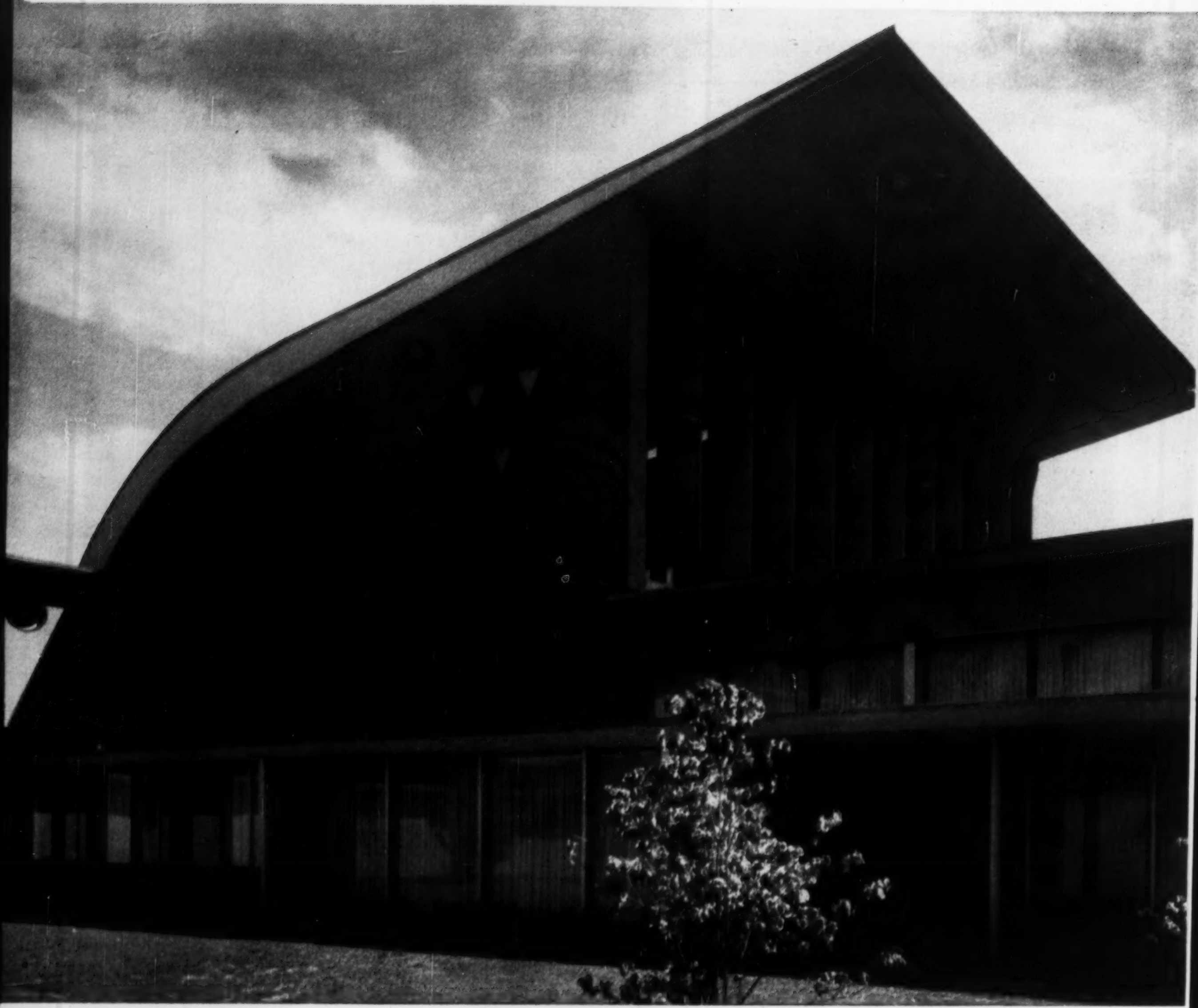

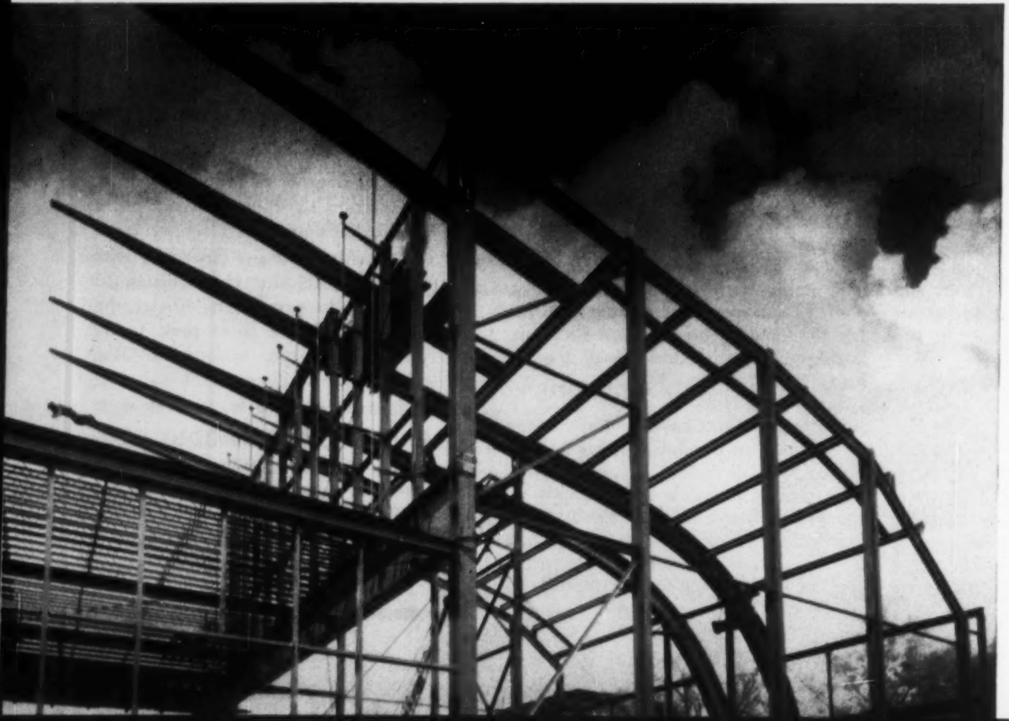

Temple B'Nai Amoona. Architect: Eric Mendelsohn, A.I.A. Engineer: Isadore Thompson, San Francisco. Fabricator: Mississippi Valley Structural Steel Co., St. Louis. Erector: Ben Hur Construction Co., St. Louis. General Contractor: I. E. Millstone Construction Co., St. Louis.

→

The temple, assembly wing, and school are tightly arranged around an enclosed garden. The deep columns together with the overhang of roof slab form a system of sunbreaks.

←

Erection of the curved beams. They are 42 in. deep at their bases, tapering to 3½ in. at the edge of the cantilever. The flanges and web were welded together in the shop and each rib shipped to the field in three sections. They were then erected end to end on falsework, and the splices welded.

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Temple B'Nai Amoona in St. Louis, Missouri, consists of a temple proper, foyer, assembly wing, school, library, administrative offices, and chapel. The main roof of the temple is supported by dramatically curved and tapered steel beams, which rise, then cantilever out 26 feet from their supporting columns. The supporting columns extend down to a steel girder in the assembly roof. This cantilever overhang acts as a sun shade for the west wall's glass screen, and is so well balanced that the long, arched beams seem almost to be pulled down to the supporting columns under tension, instead of resting compressively on them.

The temple proper has a seating capacity of 600 persons but the lower assembly wing may be opened to become a continuation of the temple, increasing the capacity to 1500. The roof structure of the lower wing is steel joists supported by 36-foot WF spanning beams, under a $2\frac{1}{2}$-inch concrete slab.

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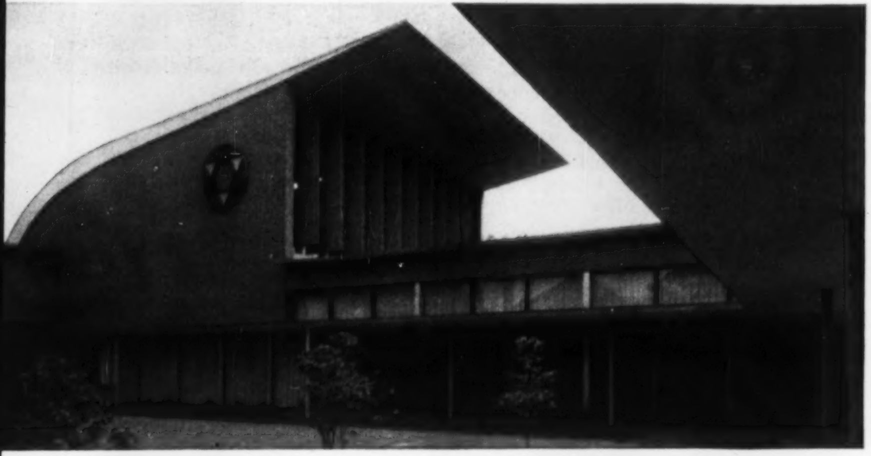

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There were death and destruction as Northeast streams went wild last August.

Floods in 1955 Did Damage Exceeded

Disastrous floods in the Northeast and Far West, and somewhat lesser floods in between, made 1955 the second worst year in U. S. history for damage by uncontrolled waters.

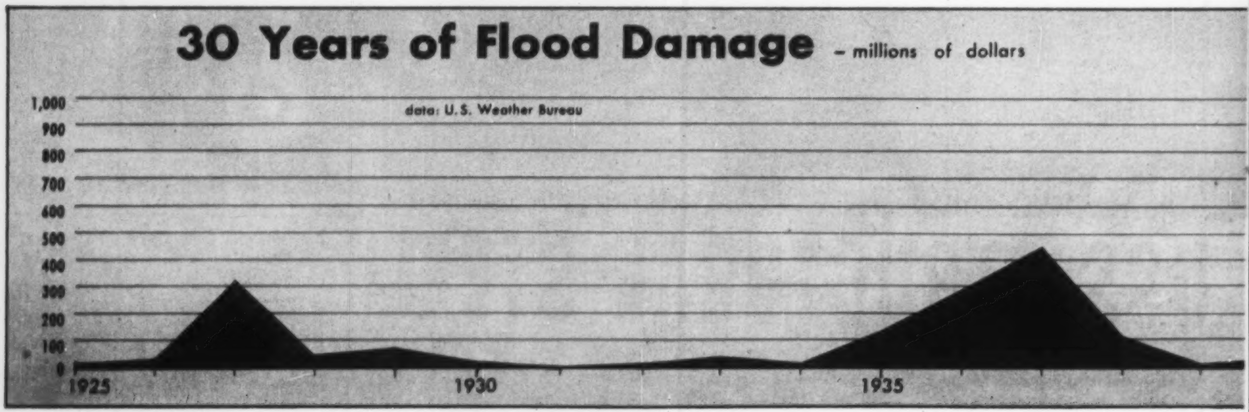
Effect of these disasters, in areas less accustomed to flooding than say the Missouri, Ohio or Columbia basins, is already apparent in thought and action on flood control efforts for 1956.

Floods dominated the river use and control picture for 1955, but there were many other notable developments: The Northwest recorded a surge of new hydro-power projects; the Southwest suffered along with its prolonged drought situation; navigation works on the Ohio marked a real start on the programmed 20-year modernization; and on the St. Lawrence, power and seaway work boomed.

In August, the crippling, crashing waters of relatively small rivers wrought havoc in Pennsylvania, New York and Southern New England, as a 12-in. rain fell in 24 hours from the tail of a tropical hurricane.

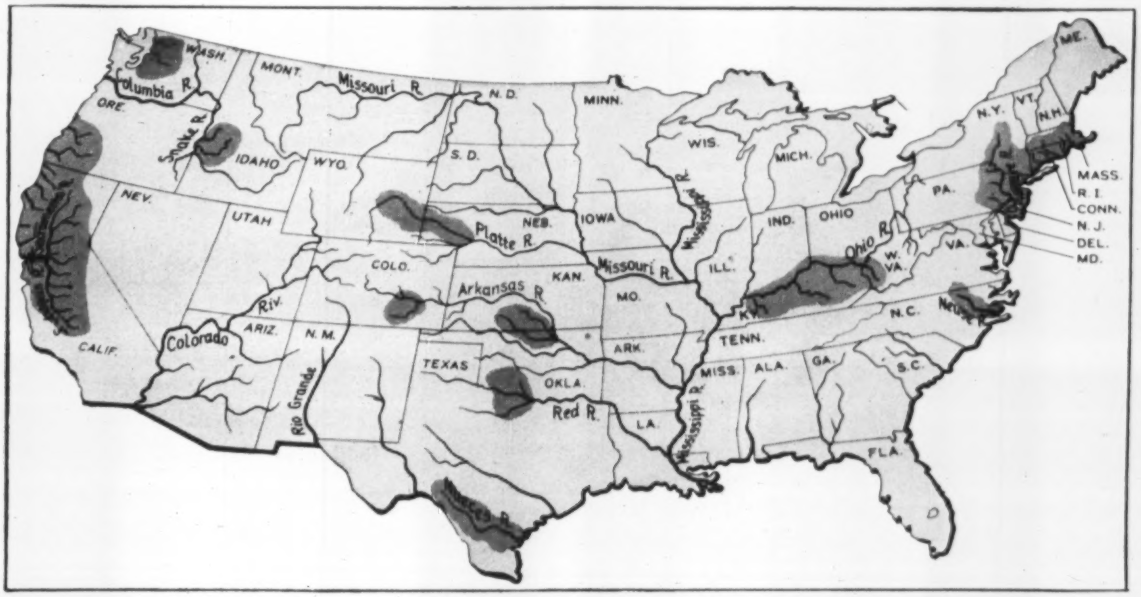
Then an October storm, not a hurricane, poured somewhat lesser rains along the Connecticut shore, just at an abnormally high tide, to cause streams to rise and ruin major coastwise rail and road communications.

And finally, December rains came to Northern California, bringing $100 million worth of damage. A levee break on the Feather River caused inundation of Yuba City with destruc-



30 Years of Flood Damage - millions of dollars

data: U.S. Weather Bureau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The Northeast and Far West were not the only areas flood-stricken in 1955.

But Once

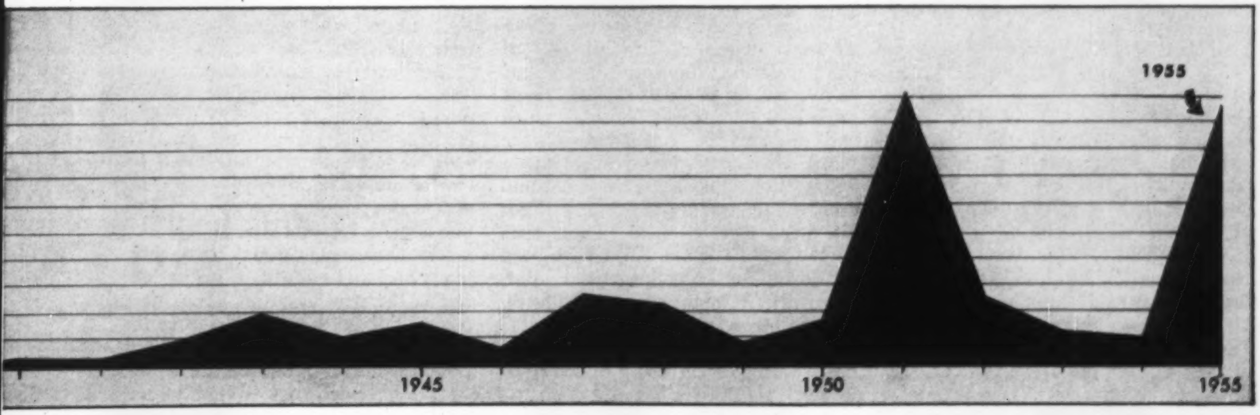
tion of 280 homes. It had rained 30 in. in 12 days at some locations.

There were floods in other areas, too, in 1955, as shown on the map above. But it was the three major calamities on the east and west coasts that stirred thought and action sure to affect river control construction in 1956.

There already has been action to benefit the stricken Northeast areas: a $45 million request for five dams that could be started immediately was in the President's budget message the first of the year. Nothing so definite has been done toward improving flood protection for the California area hit, but there has been talk of building Oroville Dam of the Feather River scheme now rather than later, and of seeking some federal funds for it due to its flood control value.

• Full speed on the St. Lawrence—Last year was the first full year of construction on the International Rapids section of the St. Lawrence. As such, it was largely a year of make-ready—at least in view of what is to come. The big contracts were let, the holes were dug, the first-stage river diversions were accomplished and the construction plant and manpower were marshalled. Unquestionably, 1956 at its construction peak will see one of the busiest concentrations of heavy construction imaginable there along the St. Lawrence. By summer, there will be concreting operations going strong on three major dams, one lesser dam and three big locks. Some 7,000 workers will be in the area, with scores of contractors working for four owners or owners agents. On each side of the international boundary there are two agencies to handle the separate power and navigation elements of the work.

• Northwest hydro reawakening—After several years of marking time with no starts, new hydro-power projects were begun in the Pacific Northwest in



CENTER OF INTEREST in 1955 was the St. Lawrence power and navigation project. First stage of Long Sault Dam was made ready for concreting (above) while other work both sides of the border pointed to a big 1956 construction season.

1955, and more will start in 1956. The work will provide new generating capacity just in time to avert a power shortage in the early 1960's when all presently planned generators at Chief Joseph and The Dalles dams will be on the line.

To some extent the new projects evidence the partnership policy of the Eisenhower Administration. But to an even greater extent the new works are a realization by local utilities—both publicly and privately owned—that they must take action to keep up with rapidly growing demands. This type of local action is partly what the administration had in mind in its partnership program. Another facet of the new works is an implied commitment by Congress that the federal government will continue to develop power projects in the area—even if on a scale reduced from such tremendous works of the past as Bonneville, Grand Coulee, McNary, Chief Joseph and The Dalles.

Thus, in 1955, construction men started work on Oxbow, Brownlee, Mayfield, Noxon Rapids and Ice Harbor dams. And in 1956, forces will be moving in on Swift, Priest Rapids, Mountain Sheep and Pleasant Valley dams. The five new projects that were started in 1955 will provide 1,211,000-kw capacity at a cost of $352 million. Those that will start in 1956 total 2,872,000-kw capacity and will cost $617 million.

Of those started, Oxbow and Brownlee are being built by Idaho Power Co. in the Hells Canyon section of the Snake River. A start was made possible by an FPC ruling in favor of the private company. Public power zealots will still try to stop construction; Hells Canyon has become a symbol of private versus public power development. Whether the projects can be stopped remains to be seen, and meanwhile, work goes ahead.

Noxon Rapids in western Montana is a long contemplated project of the Washington Water Power Co. and is not controversial. Mayfield, a Tacoma City Light project, is still tied up by legal proceedings even though construction is under way. Fish interests claim this portion of the Cowlitz River is a fish sanctuary. Ice Harbor is strictly a federal project. Congressional appropriation of $1 million in mid-1955 came as a surprise to many. But it is considered an implied commitment that further construction funds for lower Snake River dams will be forthcoming.

The projects due to start in 1956 all seem definite. But this sort of thing is never certain until dirt begins to fly. Pacific Power & Light's Swift projects needs an FPC license, which will probably be forthcoming since PP&L already has two dams—Merwin and Yale—on the Lewis River. Mountain Sheep and Pleasant Valley Dams also need FPC licenses. These sites on the middle Snake River have been considered by federal agencies. But, as no definite plans seem to be forthcoming, it seems certain that FPC will license their construction by Pacific Northwest Power Co. which is jointly owned by Washington Water Power Co., Pacific Power and Light Co., Montana Power Co. and Portland General Electric. Finally comes Priest Rapids—the largest of the new projects. To be built by Grant County PUD, Priest Rapids is a true partnership project with Congressional authorization permitting PUD construction.

• Missouri Basin benefits—Calendar 1955 may well be recorded as the greatest single year of accomplishment in the Corps of Engineers' $2.5 billion Missouri River Basin development program under the Pick-Sloan Plan. It witnessed significant advancements in construction as well as substantial benefits from the four big main-stem dams on the Missouri. For the first time, Fort Peck in Montana, Garrison in North Dakota, and Fort Randall and Gavins Point dams in South Dakota were sufficiently advanced to function as an integrated river control and water conservation system.

Although the runoff in the basin was only 60% of normal, this system provided adequate water to fulfill all essential requirements along the Missouri. Specifically, the integrated system of multipurpose dams helped furnish water supplies for about 2,000,000 users along the river; maintained a reasonable navigational channel below Omaha; built up sufficient storage in the new Garrison Reservoir to meet initial hydro-power requirements; and maintained a satisfactory power head at Fort Randall. Twice last year emergency water releases

NEW SAUERMAN SLACKLINE CABLEWAY INCREASES PRODUCTION OVER 25%

Bucket breaks water with heaping load from a 100 ft. depth…

Wherever deep digging is required and operating spans are long, the new Sauerman Slackline is adding to its margin of superiority over other types of excavators. Production increases of over 25% and in some unusual cases as high as 80% are reported.

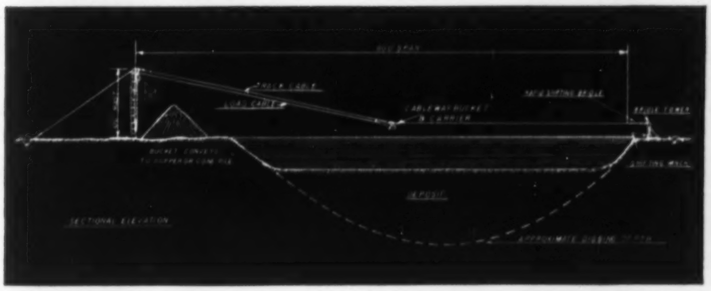
Not only is production increased but operating costs are lowered as cable and hoist wear is reduced and the machine runs with fewer peak loads and shocks—all possible from a cushioned drive using a torque convertor and other refinements.

These benefits are also available to present owners of slackline cableways. Guaranteed Gravel & Sand Co., a Sauerman Slackline user for over 35 years, has increased hoist speeds from 230 to 350 fpm. on the digging cycle and conveying speed to 800 fpm.—a gain of 25%. Guaranteed's 2-cu. yd. bucket is digging 450 ft. away from the surge pile and delivers 150 cu. yds. per hr.

The Sauerman Method lets you work distant material—up to 1,000 ft. away and dig 100 ft. or more below water. Now more than ever the greater tonnage available through fluid drive operation makes a Sauerman Slackline Cableway the low cost way for deep digging.

Get the best machine for your job. Write to Sauerman for expert advice on any materials handling project. For additional information on slackline cableways, ask for Catalog C.

is conveyed and dumped automatically at surge pile.


TRACK CABLE
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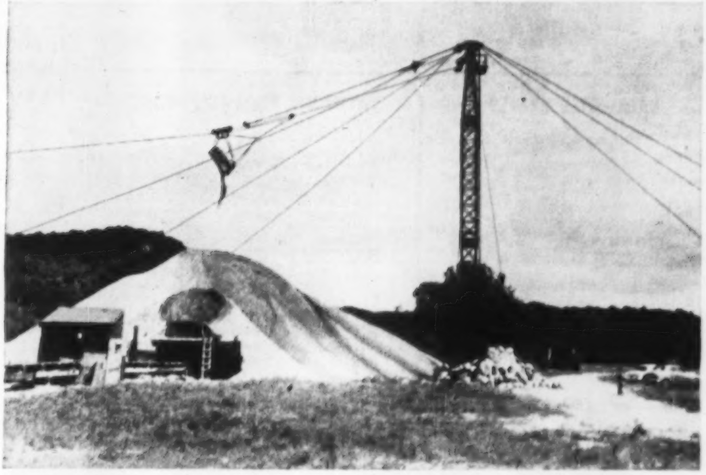
CABLEWAY BUCKET & CARRIER
RAPID SHIFTING BRIDLE
BRIDLE TOWER
BUCKET CONVEYS TO HOPPER OR CONE PILE
DEPOSIT
SECTIONAL ELEVATION
APPROXIMATE DIGGING DEPTH

Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.



Guaranteed Gravel and Sand Co.'s slackline bucket dumps 150 cu. yds. per hr. on surge pile from digging point 450 ft. away.

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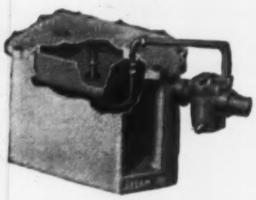

To intercept grease, oil, gasoline, hair, plaster or sediment and prevent entry into drain lines.

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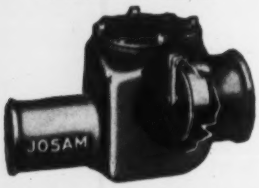
To eliminate the noise and destructive action of water hammer in supply lines.

BACKWATER VALVES



To prevent sewage from backing up into basements.

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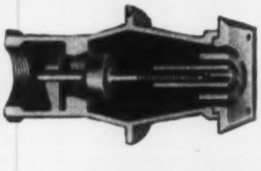

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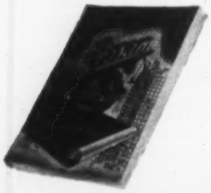

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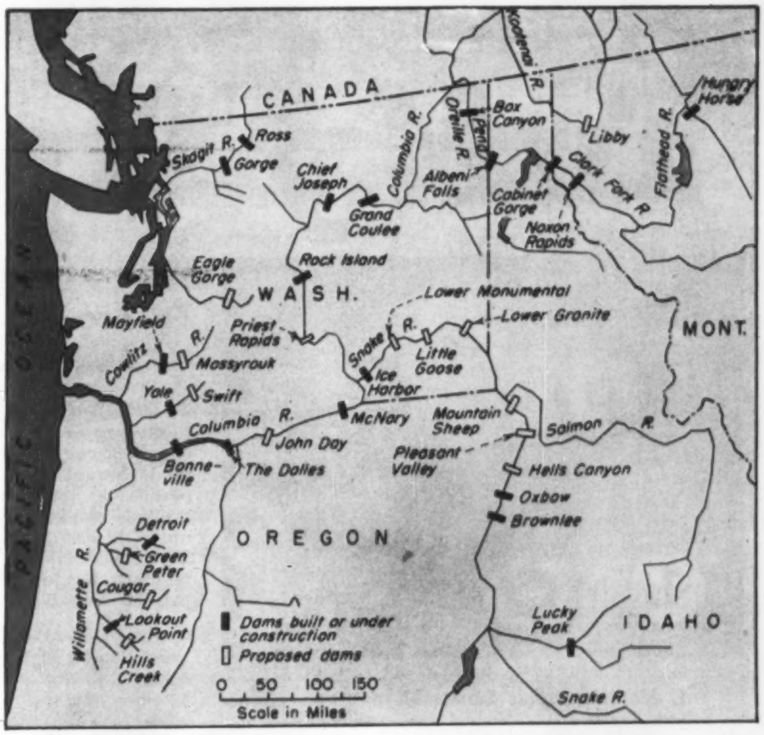
CANADA
Kootenai R.
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Ross
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Chief Joseph
Columbia R.
Oreille R.
Pend
Albeni Falls
Cabinet Gorge
Clark Fork R.
Grand Coulee
Noxon Rapids
Eagle Gorge
Rock Island
WASH.
Lower Monumental
Lower Granite
Mayfield
Priest Rapids
Snake R.
MONT.
Cowlitz R.
Mossyrouk
Little Goose
Ice Harbor
Yale
Swift
Columbia R.
McNary
Mountain Sheep
Salmon R.
John Day
Pleasant Valley
Bonneville
The Dalles
Hells Canyon
Oxbow
Brownlee
PACIFIC OCEAN
Detroit
OREGON
Willamette R.
Green Peter
Cougar
Lookout Point
Hills Creek
Dams built or under construction
Proposed dams
0 50 100 150
Scale in Miles
Lucky Peak
IDAHO
Snake R.

SURGE OF ACTIVITY was evidenced in the Pacific Northwest where power producers definitely closed a hiatus in new construction starts.

through the system were used for urgently needed power production in the upper basin.

- **Drought in the Southwest**—While other areas of the country suffered devastating floods, the arid Southwest watched its meager water supplies continue to dry up. As a result, a decided trend developed toward more active interest in river use. Water shortages of the area are due to two factors: current drought conditions and loss of what rain does fall by evaporation, transpiration and deep percolation. As long as water shortages plague the region, more and more interest will be shown in efficient water utilization through improved river development. One of best examples is the channelization on the Rio Grande in New Mexico, which has already proved its value for flood control and salvage of water.

- **Floods despite drought**—From the overall standpoint, the field of water resources development in the Southwest poses many complex and diverse problems. During the last five years there have been some of the most severe drought conditions in history, and yet, there have been critical floods somewhere in the region each of those years. The trend, therefore, is toward river development on a more comprehensive, basin-wide basis, taking into consideration the rapid expansion of the Southwest with its ever-increasing demands for municipal, industrial and agricultural water uses. As a result, the partnership of federal, state and local governmental units is becoming more than ever a critical necessity.

- **Ohio River modernization**—Continually growing river traffic gives emphasis to the Corps of Engineers' program of modernizing navigation facilities on the Ohio. This includes the elimination of inadequate 40-to-50-year-old locks. There were big strides taken last year toward realization of the 20-year modernization program with the start of construction on two new dams—one just below Pittsburgh, the other at Greenup, Ky. But an even more significant development was the approval by the Secretary of the Army, under authority of Section 6 of the 1909 Rivers and Harbors Act, of the proposed modernization of Lock and Dam 41 at Louisville—undoubtedly the biggest single remaining navigation bottleneck on the Ohio.

- **Rocky Mountain diversion**—A most notable water development during the current year will be the practical completion of the $160-million Colorado-Big Thompson project. It is designed to divert up to 310,000 acre-ft of surplus water from the headquarters of the Colorado River on the western slope, under the continental divide, to supplement the irrigation of 615,000 acres in northeastern Colorado. The final irrigation feature—the South Platte Supply Canal—will carry water to irrigators during the 1956 season. An estimated $40 million of additional crops were produced during the past two drought years as a result of diverting supplemental supplies of water from Lake Granby. The Colorado-Big Thompson project also includes five completed hydro power plants, with a total installed capacity of 179,000 kw.

Major River Use and Control Projects

- **Columbia River**—Pouring of the final bucket of concrete for **McNary Dam**, completion of three multipurpose projects and initial hydro-power generation at **Chief Joseph powerhouse** highlighted Corps of Engineer progress on the Columbia River system in 1955. Starts were also made on first phase work for **Ice Harbor, Eagle Gorge, Cougar** and **Hills Creek** dams in Washington and Oregon.

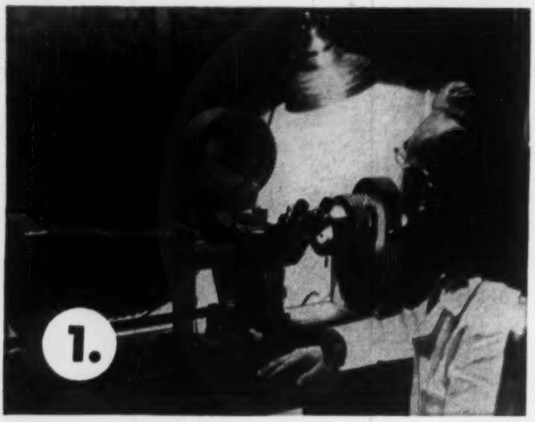
McNary powerhouse became the second largest federal power producer during 1955 (second to Grand Coulee) with four 70,000-kw units, raising the installed capacity to over 700,000 kw. Final four units for this $286 million project are scheduled to turn during 1956.

Chief Joseph Dam passed a six-year milestone in August when three 64,000-kw power units were cut into Bonneville Power Administration lines. This $200 million project, fourth major U.S. structure on the Columbia, was listed 75% complete at year's end. The huge—ultimately 2,036 ft long—powerhouse was 92% complete, and boasted four installed generators. Four more are due in 1956 and the remaining eight are scheduled for delivery of energy by late 1958. The 50-mi. long reservoir behind the year old dam provided important storage for the regional power pool.

The Dalles project with a construction outlay of $63.5 million in 1955 on the dam, powerhouse and navigation lock was 52% complete based on its $309 million cost. Final phase contract, for the rockfill closure dam to be part of the permanent structure, was awarded in September for $4.3 million. Scheduling calls for 2,250,000 cu yd of fill, to begin late in 1956, and the 600-ft wide channel to be closed by Aug., 1957. The 125-ft high spillway dam was listed 97% complete. First power

(Continued on page 118)

Tuffy® Tips


1.

Here Are Some Of The Steps Taken To Pre-Determine Tuffy Toughness And Assure Longer Rope Life

1. Metallographic Examination. Under powerful magnification, Union Wire metallurgists examine the microstructure of the steel in rods and wires to see that rigid specifications are met and maintained in processing.

2. Chemical Analysis Laboratory. Steel for Union Wire Rope is made to rigid specifications. Here rods and wire are chemically analyzed to make certain that the correct combinations of carbon, manganese, etc., are kept under control.

3. Designed by Union Wire Rope Engineers. This accelerated fatigue tester is equipped with sheaves from 8" to 24" permitting application of any bending stress. Tensile loads up to 12,000 lbs. are applied. Thus wire rope life under toughest fatigue conditions is pre-determined.

4. Rope Testing Machine. This 3-story high machine is designed to test and record the breaking strength of the rope when finished and ready for the customer.

5. Static Flexibility Tester. The demand of machinery engineers toward smaller sheaves and higher speed made it necessary for Union Wire Rope Engineers to adapt this standard machine in order to test static flexibility.

6. Wire Tensile & Torsion Tester. In tension and under torsion, this machine tests wires to see that they measure up to the extraordinary high level of strength and toughness mandatory in Union Wire Rope.

7. Another View Of Accelerated Fatigue Tester. Shows simultaneous testing of three different wire rope constructions. Here, in days, ropes are subjected to punishment equal to weeks or months of hard service.

8. Wire Fatigue Testers. The fatigue strength of wire rope is the sum total of the fatigue strength of the wires in its construction. Here, the wires in tension and bending are tested for fatigue strength.

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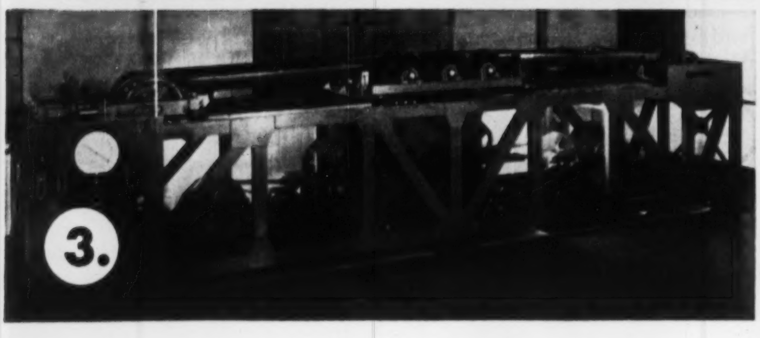
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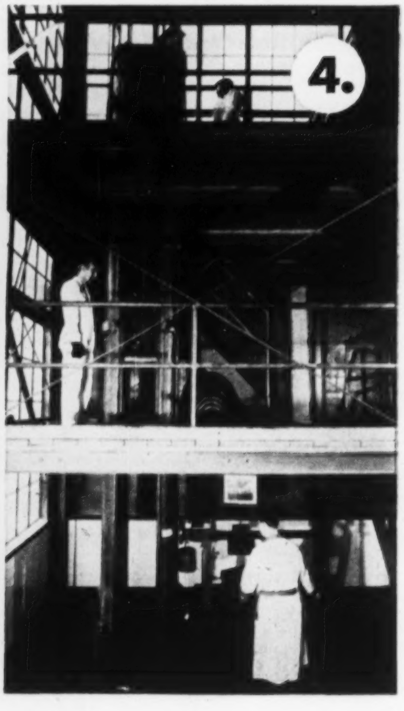
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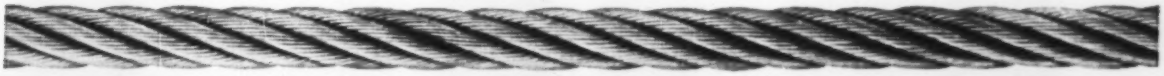
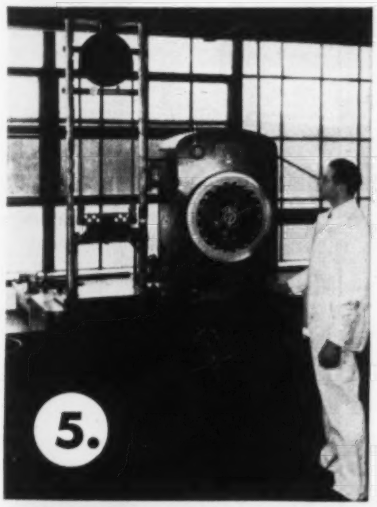


How Research Puts Longer Service Life Into WIRE ROPE



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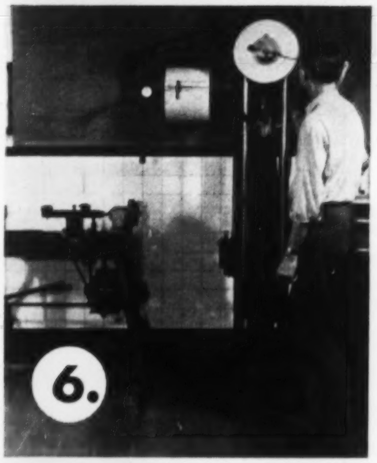

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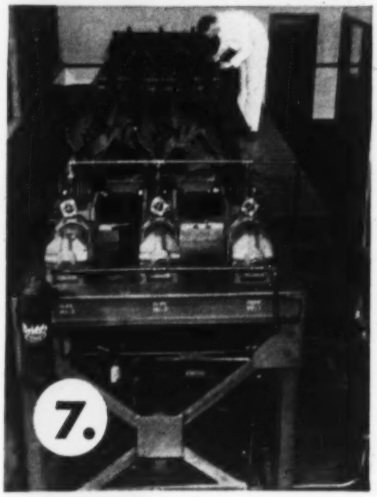

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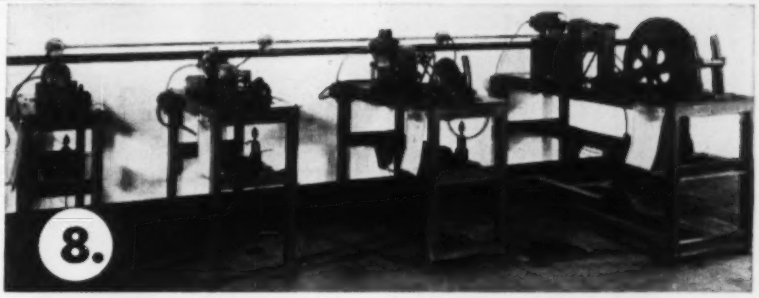

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It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.

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Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine braided wire fabric. Kinking or knotting will not materially damage fabric.

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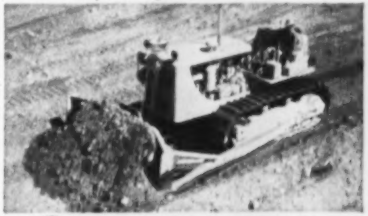

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He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

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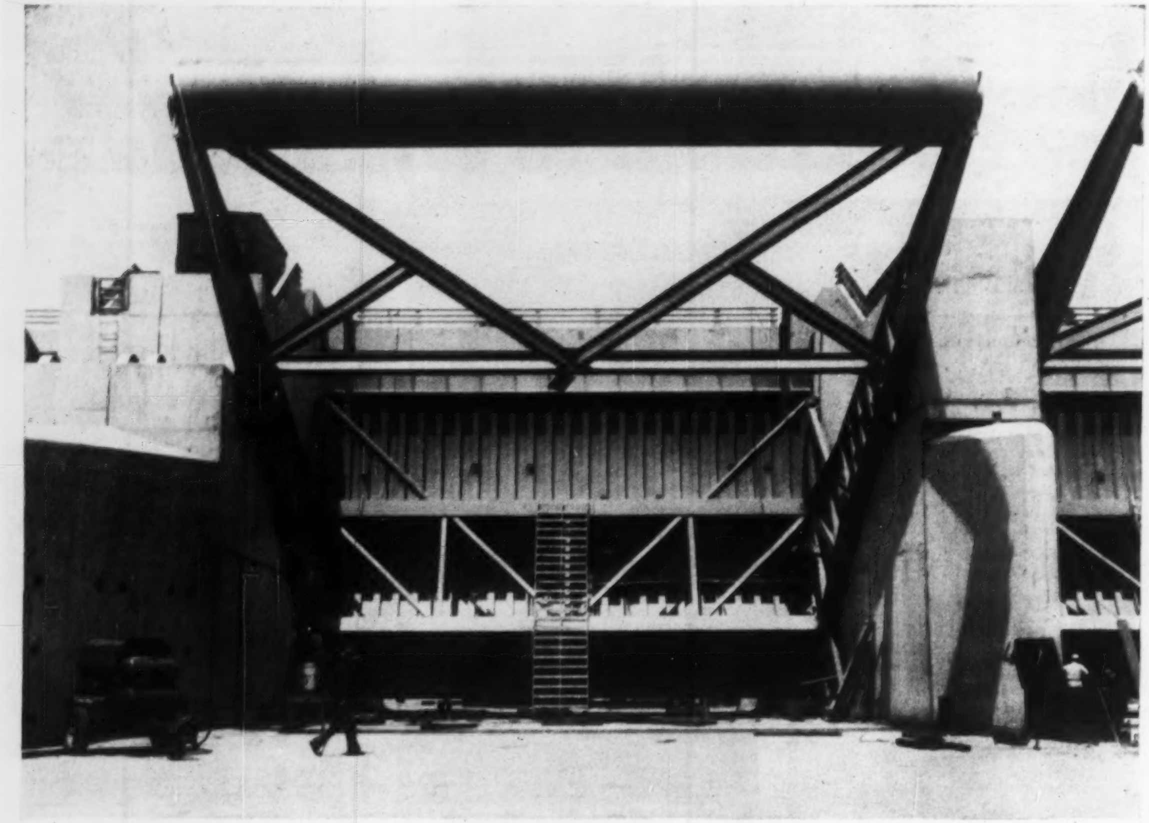

GATE TO STOP FLOODS of the San Gabriel River is one of nine. These 50x29-ft counter-balanced control units are on Southern California's Whittier Narrows Dam which was completed and dedicated last year.

unit of 78,000 kw is slated to deliver energy by late 1957, all 14 by late 1960.

Completed during the year: **Albeni Falls Dam** on the Pend Oreille River in northern Idaho, a $31 million structure with three 14,200-kw units and valued for Pend Oreille Lake storage regulation; **Lucky Peak Dam** on the Boise River in Idaho, a flood control-irrigation storage benefit project costing $20 million; **Lookout Point** and **Dexter** dams on Oregon's Willamette River, an $87 million project which put two 40,000 kw units on the line and in late December won credit for the bulk of control that shaved 9 ft off a Willamette flood crest. It was estimated Lookout Point held back 427,000 acre-ft of the one million stored by the five completed Willamette dams.

Started during the year: Access work for **Ice Harbor** on the lower Snake in Washington, a $135 million project for which Congress earmarked $1 million. **Hills Creek Dam** a $33 million project on which site explorations were finished preparatory to a diversion tunnel contract in May and the main dam and relocation contracts later in 1956; **Cougar Dam** on Oregon's McKenzie River, a $38 million project in the Willamette Basin control plan, which was readied for contracts; and **Eagle Gorge Dam** on the Green River in Washington, to cost $21 million, for which a first contract to relocate Northern Pacific Railroad tracks—was being negotiated.

Planning for **John Day**, the $309 million dam needed to complete slack water navigation on the lower Columbia to Pasco, Wash., was concentrated on foundation data at two sites above and three below the confluence of the John Day River. The dam is located between The Dalles and McNary and may turn out to be a partnership project.

- **Tacoma City Light**—Contracts totalling $17 million were awarded for construction of **Mayfield Dam** on the Cowlitz River and equipment of a 40,000-kw powerhouse. The project was hampered by legal troubles but, at the end of the year, work was under way on a tunnel 800 ft long from the proposed reservoir to the powerhouse. Mayfield dam is a 185-ft high concrete arch dam with gravity wings and thrust blocks.

- **Seattle City Light**—Construction was started during 1955, with completion scheduled for 1959, on a $17 million diversion dam on the Skagit River at **Gorge.** The dam, to supplant an existing low dam, will add 47,000 kw to the capacity of the Gorge power plant. Work also was begun on installation of a fourth 90,000-kw unit in the **Ross** powerhouse, with completion of the $6 million installation scheduled for next October.

- **Box Canyon Dam**—Construction of the $17 million Pend Oreille County PUD project was completed during 1955, adding 66,000 kw to the Northwest power pool.

- **Hells Canyon**—Work started late in 1955 on two of the three Idaho Power Company dams in the Hells Canyon region of the Snake River with award of an $87 million contract for **Oxbow** and **Brownlee** dams. At the end of 1955 construction crews were fighting some of the most severe weather in recent history to build access roads and establish initial construction footholds in the steep canyon. The $63 million Brownlee project will be a 395-ft high, 1,320-ft long impervious-core rockfill dam with 360,000-kw initial power plant capacity. Its 57-mi. reservoir is credited with 1,500,000 acre-ft of flood control space. The $24 million Oxbow project will be 12 mi downstream and will have 151,000-kw initial generating capacity. Also an im-

ELIMINATING STREAM POLLUTION FOR A GREATER AMERICA

LOOKING DOWN vertical shaft to tunnel driven 33 feet under six-lane highway. Unaffected by weather conditions, men work around the clock in tunnel headings. Steel plates line shaft and tunnels, protecting men against cave-in.

MINING IN TUNNEL progresses close to pay line. When 4 square feet of ground is exposed, man bolts next plate into ring.

How COMMERCIAL tunnel liner plates are a time and money saving answer in soft ground tunnel construction. . .

RAPID PROGRESS is being made in driving 8400 feet of tunnel at depths as low as 33 feet below the surface by Mountain State Construction Company for the Sanitary Board of the City of Charleston, W. Va. Tunnels 84" and 68¾" in diameter, when completed later this year, will become part of the project that will intercept and pick up existing sewage lines now dumping into the Kanawha and Elk Rivers and divert the flow of all raw sewage to a new disposal plant now under construction.

Several major problems were overcome when consulting engineers decided, and the contractor agreed, that the steel tunnel liner plate system was the ideal method to use in driving these tunnels. I.V. Cunningham, Owner of Mountain State, says that he is using 2,000,000 pounds of COMMERCIAL steel liner plates because simplicity of the COMMERCIAL system makes rapid progress possible even though tunnels are being driven close to the river in wet ground where cave-ins are a constant hazard and beneath Kanawha Boulevard where traffic continues uninterrupted on one of Charleston's busiest arteries.

CHECKING ALIGNMENT, Vernon Cunningham says, "Once the first few feet of tunnel liner plates are in place, the remaining rings are practically self-aligning."

LA 14

Setting the proper ground support quickly as mining progresses in the heading of a soft ground tunnel is of utmost importance. COMMERCIAL liner plates are curved to the exact required radius and because of their size, weight and design, one man can easily and quickly set them into place. Bolts are slipped through matching holes punched in the four inside flanges of the plates and nuts tighten up quickly with the use of only a spud wrench. There is nothing awkward in bolting the COMMERCIAL plate into place because everything is out in the open and you see just what you are doing.

Starting this contract with unskilled workmen, Mountain State has found that it worked out perfectly to let their men learn the COMMERCIAL liner plate system on the job, and in short order the crews performed as teams. With actual physical labor reduced to a minimum and the fear of cave-in hazards negated, Vernon Cunningham says, "They are happier workers than any I have seen in all my years in the construction business. This, of course, pays off in results. For my own part, I have found the COMMERCIAL liners a time and money saving answer to a difficult construction problem."

REMOVING MUCK from heading places additional load of 1500 pounds on monorail system suspended from steel liner plate lining.

Can we be of assistance to you on your next tunnel job? There's no obligation.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
Youngstown, Ohio Chicago, Illinois Salt Lake City, Utah

COMMERCIAL
shearing and stamping

LOCK TO LIFT TRAFFIC on the Cumberland River is part of $48.8 million Old Hickory project in Tennessee. By next December, power also will be installed.

pervious-core rockfill dam, **Oxbow** will be 205 ft high. Idaho Power's version of **Hells Canyon Dam** will be started at a later date.

• Noxon Rapids Dam—Washington Water Power Co. plans to prepare terrain in April, start a north channel cofferdam by July, and begin earthfill excavation by October for the Clearwater River dam at its **Noxon Rapids** site in northwestern Montana. During 1955 the $85 million project to produce 385,000 kw was licensed by FPC and land acquisition was completed. Contracts were let for bridge construction as part of a 17-mi. Northern Pacific railroad relocation which should be done in 1956. The Noxon Rapids dam, 23 mi. upstream from Cabinet Gorge, will require 3,000,000 cu yd of concrete for a 1,054-ft long, 190-ft high center section, augmented by a 1,360 ft earthfill wing on the right bank and a 2810-ft earthfill wing on the left.

• Columbia Basin—The Bureau of Reclamation's largest irrigation project is continuing to expand irrigated acreage. With the exception of some branch canal construction, the main canal system is completed to serve the 600,000 acres available for development. During 1955 lateral systems were completed to serve 54,000 additional acres, bringing to 301,402 acres the land to which irrigation water will be available in 1956. Construction was begun in 1955 on laterals to serve 47,000 acres to receive water in 1957. Eight lateral construction contracts in force in 1955 totalled approximately $9.6 million.

• Central Valley Project—The Bureau of Reclamation in 1955 advanced work on the **Central Valley Project**, bringing total expenditures to about $500 million or 60% of the completed cost.

Congress in its last session authorized the **Trinity River Division** and appropriated $1 million to start work on this $200 million plus project. Another project remaining incompleted is the **Sacramento Valley Canals** with $2.9 million having been spent on the $6.9 million **Corning Canal.** The remaining big unit of Corning Canal is a $1.5 million pumping plant. Still to be started are **Tehama-Colusa** and **Chico** canals and **Red Bluff Diversion Dam.** A start on these projects awaits the signing of repayment contracts between local interests and the federal government.

During the year the USBR completed work on the $6.9 million **Nimbus Dam,** afterbay for the Corps of Engineers **Folsom Dam,** the $4 million Nimbus power facilities and brought to within $300,000 of completion the $20 million **Folsom Power Plant,** built by the USBR at Folsom.

The year saw work advance to 99% of completion on the 150-mi. **Friant-Kern Canal** and it ended with 70% of the $59 million distribution system completed. The remaining big distribution system job is in the **Shafter-Wasco** area of southern San Joaquin County.

• Cachuma Project—The Bureau of Reclamation has practically finished work on this $14.7 million project to supply irrigation and municipal water for the Santa Barbara, Calif., region. Work is continuing on the distribution system. One of the spectacular construction features of the project was the "hot water" Tecolote Tunnel.

• Santa Maria Dam—The USBR was given $1 million by Congress to begin work on this project in Santa Barbara County, Calif. A construction contract is expected to be awarded in March after an election is held to ratify a repayment contract between the government and local interests. This project is expected to cost $17 million.

• Solano Project—Monticello Dam, key unit of the $51 million **Solano Project,** was on schedule with completion expected in October. Being built under a $4.6 million contract, the dam is a 300-ft high concrete arch. In 1955, a contract was let for start of work on the **Putah South Canal** which will cost about $9.3 million.

• P.G.&E. hydro—Pacific Gas & Electric Co. completed its **Pit 4 Powerhouse,** a part of the Pit River system, in August. The $25 million hydroelectric project, scheduled for 84,000-kw capacity, has been upped to 95,000 kw.

Meanwhile a start was made on the $35 million **Poe Project**—a 106,000-kw hydroelectric plant on the Feather River—and it will be completed in 1958. The project includes a 6½-mi. long, 24-ft tunnel on the North Fork of the river.

In addition, work was started in July on the $75 million **Kings River** project, located about 60 miles east of Fresno, Calif. The project, which will develop 261,500 kw of new gross normal operating capacity, will bring the total on the Kings River to 296,000 kw. The project will include the **Courtright Dam** and reservoir 8,000 ft above sea level on Helms Creek, a tributary of the north fork of the Kings River. The rockfill dam will be 290 ft high, 840 ft long at the crest, and will develop 102,000 acre-ft of storage on the creek. The Courtright Dam will discharge

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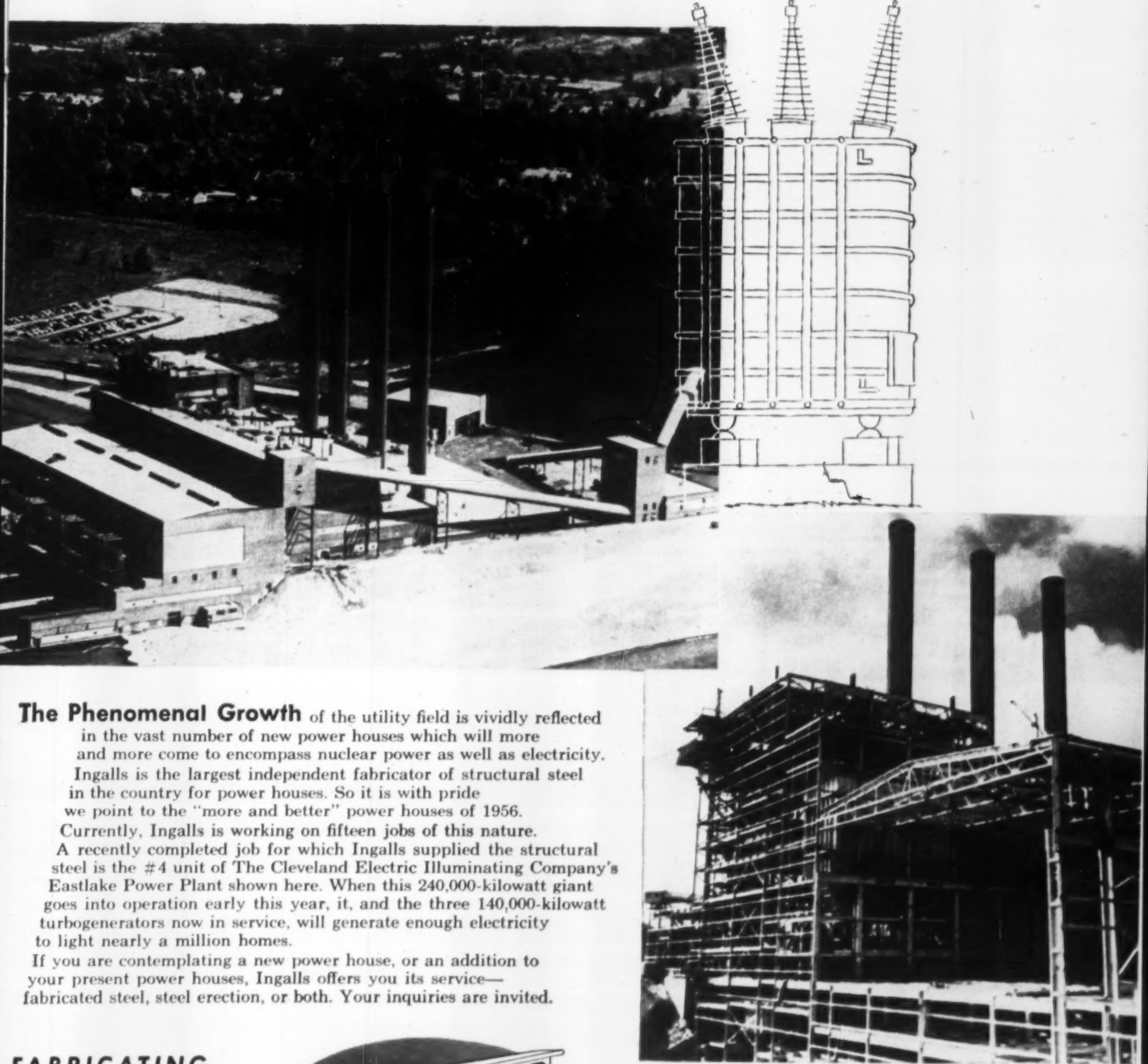

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down the creek to the **Wishon Dam,** also rockfill, on the north fork. Wishon will be 250 ft above streambed and 3,350 ft long at the crest. The project, which is scheduled for completion in three stages in 1959-60-61, also includes the **Haas Powerhouse,** to be built underground, an enlargement of the **Balch Powerhouse,** and **Kings River Powerhouse** and connecting tunnels.

- **Coyote Valley Dam**—This $18 million dam and distribution system on the east fork of California's Russian River north of San Francisco is scheduled to get under way in mid-1956. Coyote Valley will be an earth-fill dam with crest length of 2,800 ft and a maximum height of 160 ft. The reservoir will store 122,500 acre-ft of water. The project is being built by the Corps of Engineers aided by local bond financing.

- **Tri-Dam Project** — Construction was started in June on the $31.2 million **Donnells** and **Beardsley** dams and powerhouses which, with the **Tulloch Dam,** will make up the **Tri-Dam System.** Located on the Middle Fork of the Stanislaus River in the Sierra Nevada, the $52 million, 81,900-kw project will provide from 48,000 to 136,000 acre-ft of water for the **Oakdale** and South San Joaquin irrigation districts. Beardsley will be a 270-ft high earth-and-rockfill dam which will store 97,500 acre-ft of water, while Donnells, a 288-ft concrete arch dam, will store 64,500 acre-ft. Some 190 ft of Donnels Dam will be built below streambed to close a channel. Construction will start soon on the $10.5 million Tulloch dam.

- **Northern California flood control**—The Corps of Engineers huge dam building program in Northern and Central California has virtually come to an end. The year saw work completed in May on the $41 million **Pine Flat Dam** on the Kings River and the $21 million **Isabella Dam** on the Kern River. During the year progress on **Folsom Dam** on the American River near Sacramento brought the $65 million project within 99% of completion. Some $4 million in flood control work on the Sacramento River and its tributaries was also accomplished.

- **Southern California flood control**—Largest project completed by the Corps of Engineers in Southern California was the $14 million **Whittier Narrows Dam,** placed in operation in November.

Two **Rio Hondo Channel** projects totalling $5 million got under way in 1955. One, leading from the Whittier Narrows Dam, was nearing completion at the end of 1955, while the other, an upper **Rio Hondo** improvement project, was in the initial stages of construction, and is not expected to be finished until 1957.

At the end of 1955, some $31 million worth of projects were still under contract.

- **Weber Basin Project**—Work on the 3,000,000-cu yd earthfill **Wanship Dam,** main feature of the $70 million USBR's Weber Basin project to supply irrigation and domestic water for the Ogden, Utah, area is 69% complete. The 3.3-mi. **Gateway Tunnel** was completed in record time last year. The 25-mi. long, $8 million **Davis Aqueduct** is now under construction with about $4 million in contract schedules let. Work is described by USBR as behind schedule. The 7.5-mi. $2 million **Gateway Canal,** which flows into Gateway Tunnel, is 93% complete.

- **Palisades Dam**—Completion is near on the major $67 million contract of this Snake River dam in eastern Idaho. Remaining embankment on the dam to be completed this summer is 3,500,000 cu yd of a 13,800,000-cu yd total. Powerhouse building is complete; they are now installing turbines and generators. First of four units will be on line next December. Installed capacity overall is 114,000 kw. Two years of work remains for cleanup and tune up.

- **Southwestern states**—Under its civil works program of combatting both floods and droughts—which harrass the Southwest with equal vigor—the Corps of Engineers' Southwestern Division has completed 50 flood control and water conservation projects, costing about $400 millions. At present 32 authorized projects are under construction costing $865 million, of which $165 million has been appropriated. The entire program, as authorized by Congress, includes 47 more projects to cost about $1 billion, on which construction has not yet begun.

For the current fiscal year about $46 million is available for construction in the division's five districts: Fort Worth, Galveston, Albuquerque, Little Rock and Tulsa. Contracts awarded last year totaled about $40 million.

In the Fort Worth District the $10 million **Dallas Floodway** was about half finished at the end of last year, while the $3.8 million **Fort Worth Floodway** was virtually completed. This year, construction is expected to get underway on the $50 million **McGee Bend Dam,** a multiple purpose hydro power project on the Angelina River in East Texas; also on the $13 million **Canyon Reservoir** flood control and conservation project on the Guadalupe River near New Braunfels, Tex.

Navigation improvements were continued last year in the Galveston District on such major facilities as the **Houston Ship Canal,** the **Gulf Intracoastal Waterway** and the **Port Aransas-Corpus Christi Waterway.**

Major projects this year in the Albuquerque District will be construction of the outlet works of **Abiquiu Dam** on Rio Chama River in New Mexico. Also, flood control work on the Arkansas River at Los Animas, Colo.

The principal civil works in the Little Rock District last year included **Table Rock Dam** on the White River in Missouri. This year, contracts are expected to be awarded for highway relocations and for powerhouse equipment on this $78 million multipurpose project.

The Tulsa District advanced its 13-mile **Oklahoma City Floodway** to 45% of completion, while the $13 million **Wichita (Kan.) flood protection** project was 55% finished. Construction got under way last year on the $20 million **Toronto Dam** on the Virdigris River in Kansas.

• **Missouri River Basin**—About $59 million worth of contracts will be awarded in 1956—an 18% increase over the $50 million awarded last year which, in turn, was about 22% above 1954.

Garrison Dam, 75 miles northwest of Bismarck, N. D., was 83% finished. The $294 million project, to be 90% finished by the end of 1956, will be essentially completed in 1957. The 210-ft high rolled fill dam, spillway structure and gates were completed last year, and the spillway stilling basin was 40% finished. Major contracts to be finished this year include: earthwork Stage V, penstocks and surge tanks, powerhouse and switchyard, turbines and generators. Two of three 80,000-kw generators will go into service this summer.

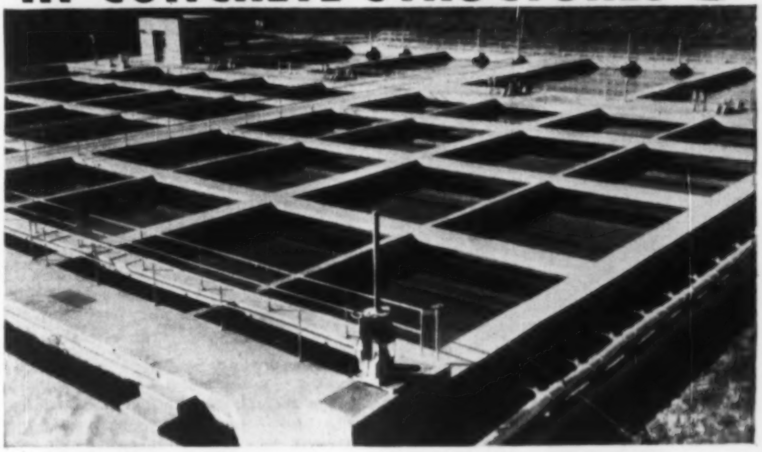
Oahe Dam, six miles above Pierre, S. D.—biggest of the four mainstem dams by almost any yardstick—will be the last one completed. The $321 million project, 14% completed last year, will be 24% finished by the end of this year. Closure of the huge rolled fill embankment, to impound 23,600,000 acre-ft of water, is scheduled for 1958, and the first hydro power unit is expected to go on line in 1961. The intake and upstream tunnel construction, 70% finished last year, will be completed this year. The outlet works stilling basin is about 20% finished. Earthwork Stage IV is nearly half finished, while Stage V earthwork was placed under contract last month. By the end of this year the downstream tunnels will be two-thirds finished, and control shafts half finished.

Fort Randall Dam near Lake Andes, S. D., has all 8 of its 40,000-kw hydro power generators in service. The $189 million project is virtually completed after 10 years of construction. The rolled fill dam itself, with a total storage of 6,300,000 acre-ft, was finished last year, together with the penstocks and surge tanks.

Gavins Point Dam near Yankton, S. D., was closed last July 31. The $53 million project, 70% completed last year, will be 85% finished by the end of this year. Major contracts completed last year in-

(Continued on page 126)

Water Leakage Problems IN CONCRETE STRUCTURES?



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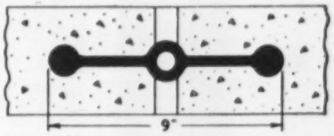

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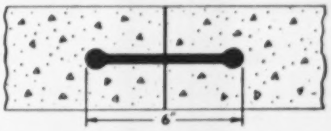

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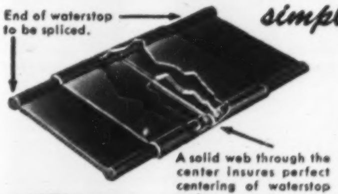
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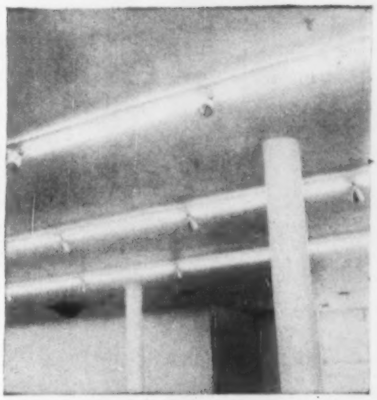

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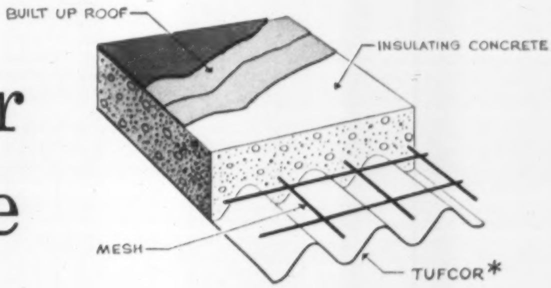

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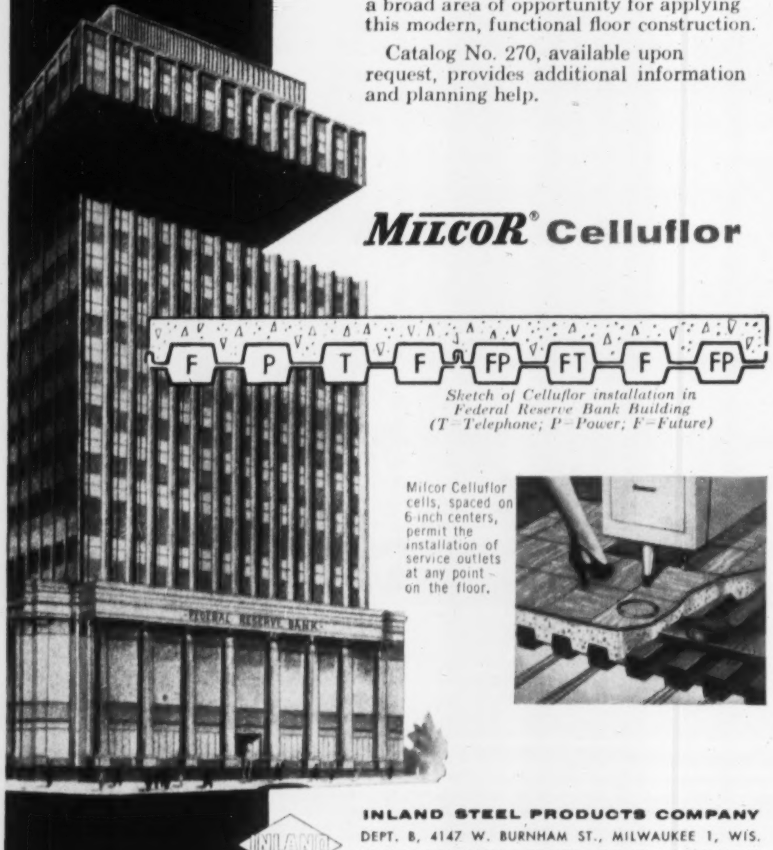

Sketch of Celluflor installation in Federal Reserve Bank Building (T=Telephone; P=Power; F=Future)

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cluded the powerhouse, spillway and Stage II earthwork. The powerhouse superstructure, together with turbines and generators, will be finished this year.

Tuttle Creek Dam on the Big Blue River above Manhattan, Kan.—an important unit in the Corps of Engineers' flood-control program for the Kansas River Basin—resumed construction, under a $7.5 million federal appropriation for fiscal 1956. Work on this $89 million project had been suspended since 1953 for lack of funds. Contracts awarded last fall included embankment construction, spillway excavation and completion of the outlet works.

• **Reclamation (Region 7)**—Last year the Bureau of Reclamation awarded $10 million worth of construction contracts and completed nearly $18 million worth of work in Region 7—covering Nebraska, and parts of Kansas, Colorado and Wyoming. Two major units of important projects were substantially completed: The **Alcova** power plant, with a total capacity of 36,000 kw, on the North Platte River in Wyoming, and the **Kirwin Dam** on the north fork of the Solomon River in Kansas. Nearby **Webster Dam**, on the south fork of the Solomon, was closed late last year and will be substantially finished by the middle of this year.

The most notable event of the current fiscal year will be the practical completion of the $160 million **Colorado-Big Thompson** project. Also, **Glendo Dam** on the North Platte River in Wyoming—one of the Bureau of Reclamation's most significant projects now under construction—was nearly half finished at the end of 1955. The 207-ft high earthfill, with a crest length of 1,947 ft, will create a reservoir capable of impounding 800,000 acre-ft. Its power plant will contain two generating units of 12,000 kw each.

Lovewell Dam on the Republican River in Kansas, one of the main features of the $49 million **Bostwick Division**, was about 40% finished at the end of 1955, and will be essentially completed by the end of this June. Expected to be placed under contract the latter half of this year or the first half of 1957, is the **Fremont Canyon** power plant, with its two 24,000 kw generators, part of the **Glendo Unit.**

• **Reclamation (Region 6)**—Biggest single construction contract to be awarded this year in the Bureau of Reclamation's Region 6—which includes the Dakotas, parts of Wyoming and Montana—is for the **Yellowtail Dam** and power plant project on the Big Horn River in Montana. This 520-ft high concrete arch dam will contain 1,660,000 cu yd of concrete—nearly one-half the volume of concrete in Hoover Dam. When completed in 1961 the project will have a hydro power plant designed for an ultimate installed capacity of 200,000 kw. Also expected to be awarded by June of this year is **Anchor Dam** on Owl Creek, west of Thermopolis, Wyoming. It will be a 200-ft high concrete arch structure, 550 ft long, and containing 66,000 cu yd of concrete. Several contracts will be awarded for the construction of irrigation canals, conduits and laterals, also for a 7-ft dia horseshoe shaped tunnel, 2.6 mi long, from **Canyon Ferry Dam**, east of Helena, Mont., to the proposed **Helena Valley** regulating reservoir, to serve an ultimate 12,500 acres of new irrigation and provide supplemental water for 5,000 additional acres. It will take about two years to complete the tunnel.

Among the major projects on which construction will be completed this year are the $13 million **Tiber Dam**, north of Great Falls, Mont., and the $5 million **Pactola Dam**, west of Rapid City, South Dakota.

- **Reclamation (Region 5)**—Construction operations in the Bureau of Reclamation's Region 5—covering Texas and Oklahoma, New Mexico east of the Continental Divide, and portions of Colorado and Kansas—are primarily centered on the **Middle Rio Grande Project** at Albuquerque, and at **Alamogordo Dam**, near Fort Sumner, New Mexico. About $3.5 million worth of construction was completed last year and a like amount is expected to be placed under contract this year. Rehabilitation of the entire **Middle Rio Grande Project**, which covers 122,000 acres of irrigated land, is scheduled to be completed in 1960, at a total project cost of $23.9 million. The project is about one third finished at present. The work consists chiefly of rehabilitation and extension of existing irrigation and drainage systems, and storage and diversion dams, together with channel rectification, eradication of vegetation, and improvement of the main channel of the Rio Grande. At **Alamogordo Dam**, on the Pecos River, a $1.2 million contract for enlarging the spillway, raising the crest of the dam about 16 ft, and making necessary modification to the existing spillway, outlet works and stilling basin, is scheduled to be finished this summer.

- **Upper Mississippi River**—River development construction under the supervision of the North Central Division of the Corps of Engineers will be stepped up considerably this year with the awarding of about $25 million of contracts. Last year $9 million of work was placed under contract, and about $3.2 million completed. Among the major contracts are **Lock No. 19** at Keokuk, Iowa, 110 ft wide by 1,200 ft long, replacing an old 110 by 358 ft lock constructed in 1913. The $13 million project, about 75% finished at the end of last year, is scheduled for completion by July 1 of next year. Navigation improvements at Minneapolis, Minn. comprising

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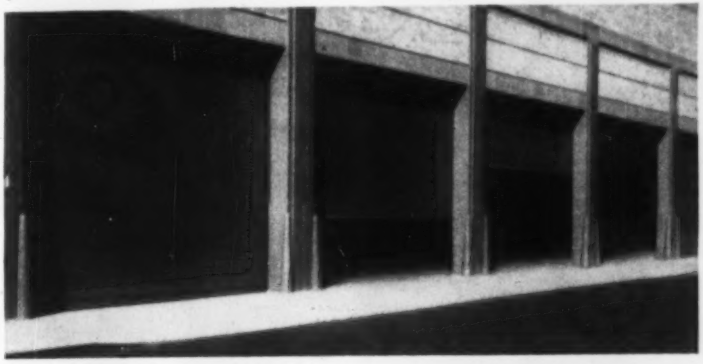
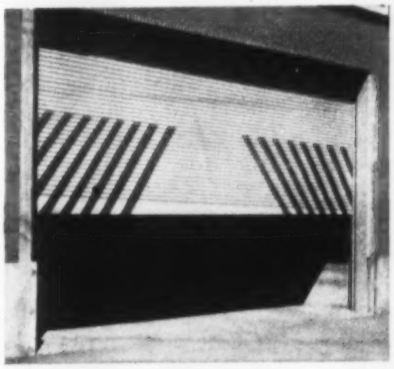
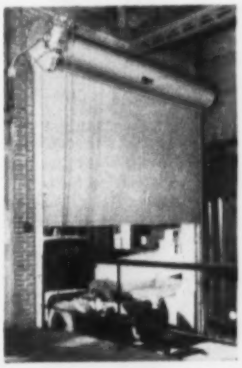
(made by the originators of the famous interlocking steel-slat door)



give you highest efficiency,

(they open straight up, coil overhead, waste no floor or wall space)

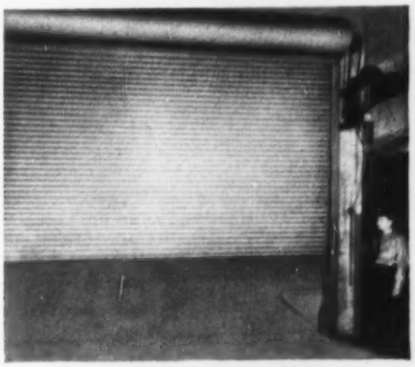




extra all-metal protection,

(their rugged steel construction resists fire, wind, theft, vandalism)

Heavy galvanizing adds 1.25 oz. of pure zinc per sq. ft. of metal by ASTM standards.



and lower operating costs

(delivering up to 20, 30, and 40 years of continuous daily service with little or no repair costs, as proved by many case records in Kinnear's files. Kinnear Rolling Doors are built any size, for old or new buildings, with manual, chain, crank or motor operation. Write for complete information.)

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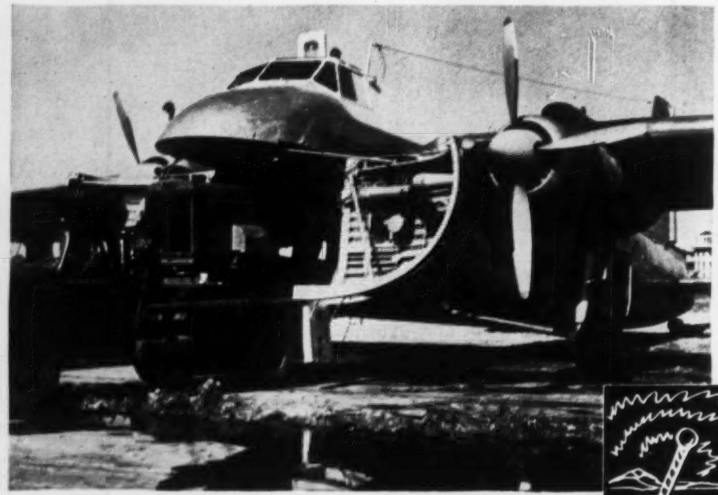

CANADA—150 hp **Waukesha Diesels** about to take off for service in the far north.

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Power packed, fast, smooth—with built-in stamina for service in any country or climate—Normal or Turbodiesels, Gas, or Gasoline Engines—up to 1135 hp. Waukesha Motor Company, Waukesha, Wis., New York, Tulsa, Los Angeles. Send for Bulletin 1079.

WAUKESHA Diesels

290

the **St. Anthony Falls Lower Lock and Dam** are about 90% complete, under a $10 million project. The 56x400-ft lock and dam were essentially completed last year.

Initial construction got underway last November on the $185 million **Illinois Waterway-Calumet Sag** modification project south of Chicago. The first contract was $1.8 million for widening and deepening the westerly three-mile reach of the Calumet-Sag Channel. The current estimate of federal cost for the entire project is $127 million, exclusive of local cooperation consisting of land, bridge and utility changes estimated to cost about $58 million.

• **Lower Mississippi**—According to the latest figure of the Mississippi River Commission, a total of $918 million has been allotted for the $1.3 billion **Mississippi River and Tributaries Project.** Last year about $45 million was spent on construction and maintenance, and about $54 million will be spent for this work during 1956; it includes contract work, hired labor, and engineering and design. Last year about 10 miles of mainline levees were brought up to project grade and cross-section along the Mississippi River, out of a total of 280 miles that were dificient at the beginning of the year. The Corps of Engineer bank stabilization program saw 28 miles of this work completed last year, making a total of 338 miles completed under the 450 mile bank stabilization program currently authorized. About 9 miles of levee work will be completed this year along the **White River,** leaving about 9 additional miles to be finished. On the **Lower Arkansas River,** 31 miles of levees will be completed by July 1 of this year, of a total project length of 67 miles.

In addition to the above construction from funds for the Mississippi River and Tributaries Project, about $28 million worth of work was completed during fiscal year 1955 and $29 million is available for obligation during the current fiscal year in the St. Louis, Memphis, Vicksburg and New Orleans districts. Some of the major projects:

The $58 million project for **Regulating Works** on the Mississippi between the Ohio and Missouri rivers is 72% finished. It provides for 191 miles of navigation channel 9 ft deep and at least 300 ft wide, between the Ohio River and St. Louis.

The $11.8 million **Flood Control Project at Memphis, Tenn.** is 84% finished. It includes 10.3 miles of levee, 3.1 miles of flood wall and 6 pumping stations for sewage and storm drainage. **Ferrells Bridge Reservoir,** on Cypress Creek, Tex., a $21 million flood control and water supply project on which construction was started last year, is 10% complete. The $33.8 million **Texarkana Reservoir** on the Sul-

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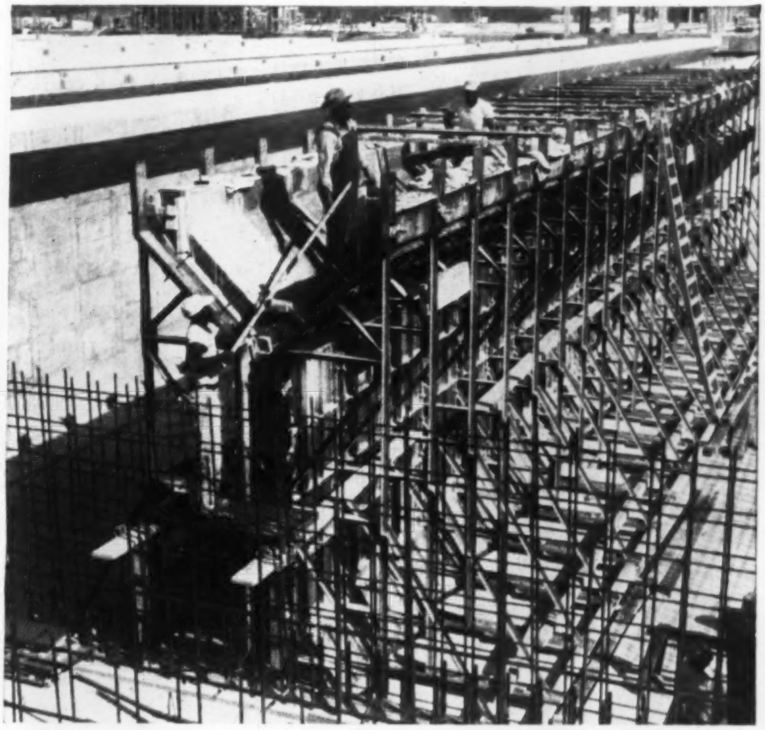

Special Y wall forming system makes for simplified stripping operation. 100% reusability of all materials. Note complete absence of lumber normally required for shoring and bracing on this type of structure.

CUTS MATERIAL COSTS with

Pre-Fab Form System on Sewage Plant Job

In the construction of the Miami Sewage Treatment Plant Job the Paul Smith Construction Co., of Miami, Florida chose to use the Uni-Form Panel System in the forming of one million sq. ft. of contact area. The contractor estimated that the use of the Uni-Form System *saved 40 percent in material costs alone.* In addition, faster form erection with fewer men kept the job moving ahead of schedule and reduced estimated labor costs considerably. These fine results were obtained even though this was the contractor's first experience with the Uni-Form Panel System.

This considerable savings in material and labor was realized in spite of intricate Y wall forming and pipe intersections which causes complicated forming problems with conventional forming systems.

Pre-fabricated, ready to use—completely engineered to handle most forming problems, the Uni-Form Panel System provides such advantages as simple assembly—minimum one side alignment and bracing—automatically accurate wall widths—positive internal spreading—faster stripping and maximum re-usage to give the contractor lowest all around form costs.

Y wall trusses designed to member with standard Uni-Form Panels formed a completely automatic system for handling the special forming problems, and were big factors in the economy and speed obtained on the job. Simple assembly of Standard Uni-Form Panels on the trusses eliminated many of the aligning, bracing and spreading problems usually encountered in Y wall construction. In addition to simplified forming the combination system of standard Uni-Form Panels and trusses eliminated many of the problems normally encountered in the stripping of a wall section of this type. The contractor was well pleased with all phases of his forming and stripping operations.

Why not investigate the many advantages the Uni-Form Panel System can bring to you? Write for the Uni-Form Catalog—or better yet, send us a set of plans for an estimate on your next job. Let us prove to you as we did to the Paul Smith Construction Co., that the Uni-Form Panel System can cut your forming costs.

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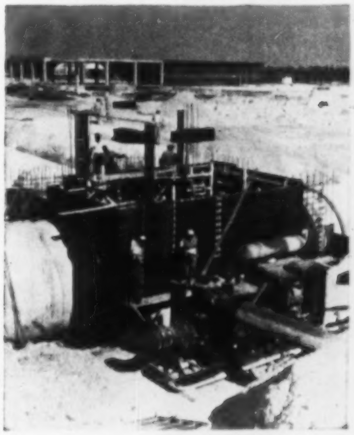

Intricate forming in restricted areas presented no problem. Uni-Form Panels erected aligned and braced one side eliminated difficulties normally encountered in placement of reinforcing steel. Note Uni-Form Panels around large precast pipe.

One side aligning and bracing provides clear unobstructed working areas increasing job efficiency.

Y wall trusses incorporated alignment, bracing, shoring and scaffolding requirements.

phur River in Texas, also a flood control project is 82% complete. Another flood control project on the **Red River,** below Denison Dam in Texas, calls for strengthening levees and bank protection under a $9.5 million contract; is 55 percent finished. Construction was begun last year on the $70 million **Old River Control Project** to keep the Atchafalya River Basin from some day capturing the lower 313 miles of the Mississippi River. And another relatively new project, now only 4% finished is the $32.5 million **Plaquemine-Morgan City** project for enlarging portions of the Gulf Intracoastal Waterway between Morgan City and Port Allen; also the construction of a new navigation lock and the construction of railway and highway bridges.

- **Ohio River Basin**—Civil works construction contracts completed last year by the Corps of Engineers in the Ohio River valley totaled $18 million, while $43 million of construction contracts were awarded during that period. About $52 million of contracts are expected to be awarded during the first half of this year, with the amount of work let during the latter half of the year depending upon federal appropriations.

Among the major projects now under construction are nine local flood protection projects in Kentucky, Pennsylvania and Indiana, at a total cost of $59 million. The largest is the $26.5 million flood protection project at **Louisville, Ky.,** containing 12.8 miles of earth levee, 4.7 miles of concrete wall and 14 pumping stations. Completion date is scheduled for June of this year.

Five big lock and dam projects are now underway at a total cost of $194 million. They are: **Cheatham Lock and Dam** on the Cumberland River, above Nashville, Tenn., costing $31.7 million, including a 110x800-ft chamber with a 26-ft lift; a concrete gravity dam and three 12,000 kw generators, now 62% finished and scheduled to be completed in the summer of 1958.

Old Hickory Lock and Dam, also on the Cumberland River, above Nashville, costing $48.8 million, with a 84x400 ft x 60-ft lift lock, a 3,700 ft rolled earth fill and concrete gravity fill dam, and four 25,000 kw generators, now 80% finished, and scheduled for completion in April 1958.

Green River Locks and Dams Nos. 1 and 2, on the Green River in Kentucky, costing $9.7 million, with two 84x600 ft. locks, two dams 470 and 500 ft long, now 84% finished, and scheduled for completion by June of this year.

Two major projects on the Ohio River itself are: The $61 million **Greenup Lock and Dam** with two parallel chambers (110x1,200 ft and 110x600 ft) with 32-ft lift, a 1,300 ft concrete dam, now 5% finished and scheduled for completion by June, 1960. This project replaces obsolete and inadequate existing Ohio River locks and dams Nos. 27, 28, 29 and 30, and lock and dam No. 1 on the Big Sandy River. The other project, replacing locks and dams Nos. 7, 8 and 9, is the $43 million **New Cumberland Lock and Dam,** with two parallel locks (110x1,200 ft and 110x600 ft) with 22 ft lift, and a 1,300 ft concrete dam, also only 5% finished at present, but scheduled for completion by June, 1959.

REVERSIBLE RUNNER for TVA's Hiwassee Dam powerhouse will make system's only pump-turbine. It also represents TVA's last fling at hydro power.

A flood control project under construction in the Ohio River Division is the $34 million **Sutton Reservoir** on the Elk River, above Sutton, W. Va., scheduled for completion by December, 1959. This project, started in October, 1949 and suspended as a result of the Korean conflict, calls for a concrete gravity dam 237 ft high and 1,208 ft long, with a flood control storage capacity of 261,000 acre-ft. Another project, started last October, is the $9.9 million **Rough River Reservoir** and channel clearing and rectification in Kentucky. The dam will be a rolled earth fill 124-ft high and 1,530 ft long, with a maximum flood control storage of 304,000 acre-ft, scheduled to be completed by December 1959.

Bids were scheduled to be received this month for two lock and dam projects in the Ohio River Basin. One is the **Markland Lock and Dam** on the Ohio River about 60 miles below Cincinnati, to be built at a federal cost of about $73.6 million, and to replace existing locks and dams Nos. 35, 36, 37, 38 and 39. There will be two parallel locks and the dam will create a pool 83 miles long. The other project is the **Hilderbrand Lock and Dam** on the Monongahela River in West Virginia, to be built at a total cost of $14.9 million, and to replace old locks and dams No. 12 and 13.

- **St. Lawrence River projects**—Last year was the first full year of construction on the **International Rapids** section of the St. Lawrence, between Ogdensburg, N. Y., and Cornwall, Ont. Four agencies were at work there: The New York State Power Authority had completed the Barnhart Island Bridge, taken out its floating bridge and made ready for a big season of concreting in 1956 on **Long Sault Dam, Iroquois Dam,** the **Massena Intake** and the U.S. half of the international **Barnhart Island Powerhouse.** The Hydro-Electric Power Commission of Ontario had established access to Canada's side of the powerhouse, made ready for full-scale concreting, relocated roads railroads and houses, performed extensive channel improvements upstream and prepared to shift the Cornwall Canal to a new course slightly back from the river. The U.S. Corps of Engineers, as construction agent for the St. Lawrence Seaway Development Corp. had begun excavation of the 10-mile Long **Sault Canal;** as part of this work, excavation was near completion at year-end for the two major locks, **Robinson Bay** and **Grass River.** The St. Lawrence Seaway Authority of Canada meanwhile had **Iroquois canal and lock** under construction in this International Rapids section. The whole power-navigation complex is geared for both turbine and lock operation by 1958.

- **Littleton Project**—The 150,000-kw **Littleton Project** on the Connecticut River about 80 miles from the Canadian border shares honors with its sister **Comerford Development** just downstream as the largest hydro project in New England. New England Electric System will complete the $45 million project in April 1956. Featured are an unusual combination indoor-outdoor powerhouse and air-cooled generators.

- **Tennessee Valley Authority**—TVA had not a single dam under construction in 1955. And in 1956, work will be completed on the two last remaining power units that can be installed at completed dams in the valley. **At Nottely Dam,** completed during World War II without power facilities, a 15,000-kw powerhouse is practically complete and soon to be in service. At **Hiwassee Dam,** a pump-turbine is being installed to be in operation early this year. This reversible unit has 59,500-kw capacity as a generator and a 3,900-cfs capacity at 205-ft head as a pump.

- **Alcoa builds another—Chilhowee Dam** is a $12 million structure under construc-

(Continued on page 134)

12
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ROADBUILDERS! HOW

New SEAMAN-ANDWALL TRAV-L-PLANT COMPLETES 22-FOOT BITUMINOUS ROAD BASE AT MILE-A-DAY RATE

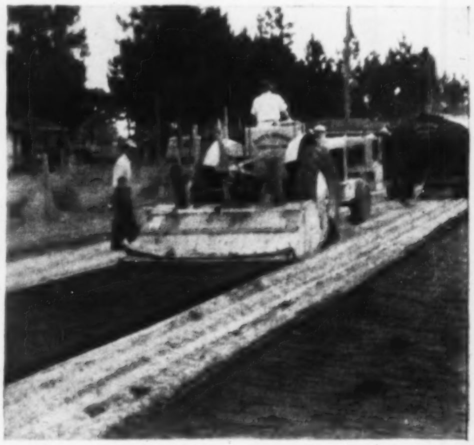
New speed in road building is announced by the Seaman-Andwall Corporation, which now offers a complete line of equipment for stabilized road construction. Roadbuilders who have been interviewed state that Seaman-Andwall Sta-Bilt equipment provides better, more durable bituminous roads at lower cost with greater strength, higher densities — built at a mile-a-day production rate.

Much of the credit for this road building speed-up is given to new versatility built into the Seaman Trav-L-Plant, a double-duty and often triple-duty machine that performs "in-place" mixing and binder application together with light scarification in one time-saving simultaneous operation.

Not only is the TRAV-L-PLANT used for new bituminous road construction, but it is widely accepted as fast, economical equipment in reconstruction of old, worn out bituminous roads. In such work the TRAV-L-PLANT as it mixes, quickly reduces the previously scarified material to original aggregate size ready for compaction.

The basic operation of the Seaman equipment is that of soil stabilization — the "in-place" mixing, blending and assembly of the base materials. It thoroughly mixes the fines and coarse materials so that voids are filled, and larger aggregates are interlocked and securely mortared-in by the fines. The mix compacts to higher, much higher, densities for greater load bearing value, longer wear and much lower maintenance.

The TRAV-L-PLANT pumps binder into the mix from a transport truck operating at the side or ahead. Full tachometer assemblies and volumetric meter provide precision application through a spray bar positioned in the mixing chamber. Binder is applied directly into the mix. Because there is no time delay between base stabilization and binder application and mixing, the bitumen has no time to cool before it's in the mix. Run-off or migration is also entirely prevented.

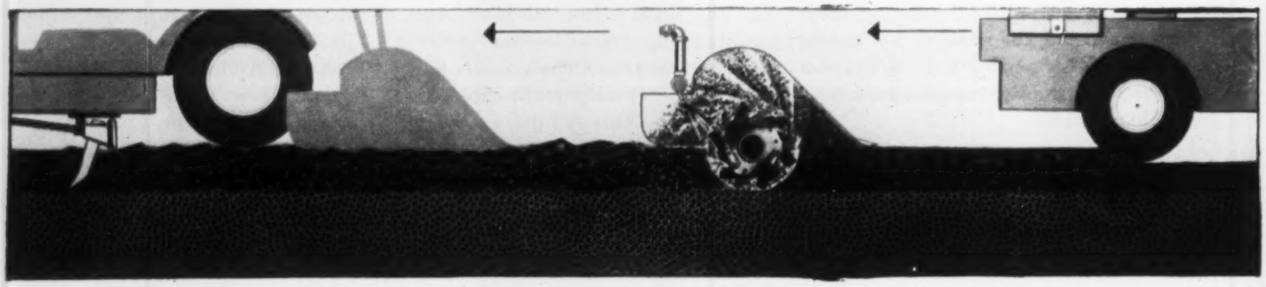


Above — Seaman Self-Propelled TRAV-L-PLANT in bituminous parkway construction, Jacksonville, Fla. Binder is pumped from transport ahead of the Seaman.

S·A

Sta-Bilt Method of Road Stabilization

The Seaman-Andwall TRAV-L-PLANT scarifies old bituminous material; the rotor reduces the lumps to original aggregate size and, simultaneously, new binder is applied through spray bar mounted just ahead of the rotor. Compaction follows immediately after the TRAV-L-PLANT has completed its operation.

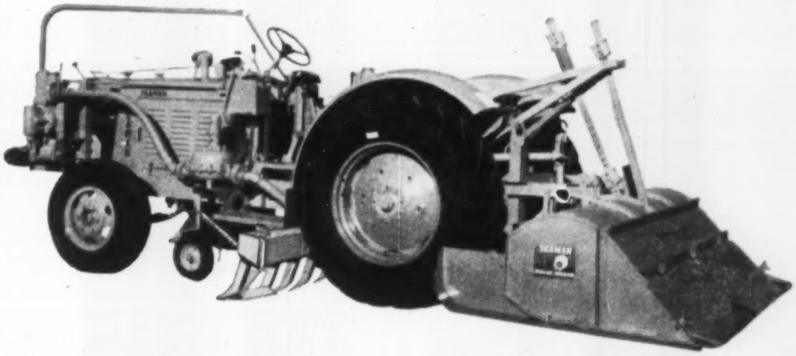


TO BEAT THE CLOCK...

The TRAV-L-PLANT leaves the surface partially compacted, ready for final rolling, an operation further improved by the new Seaman-Andwall compactor. These rollers offered in steel wheel and pneumatic models apply power to the *front* rolls. This produces a "straight down" pressure which eliminates shoving, shearing, scuffing and tearing of the surface which is so often the case with rear drive rollers. By this principle the task of compaction is correctly accomplished in much less time, and with fewer trips to attain specified density.

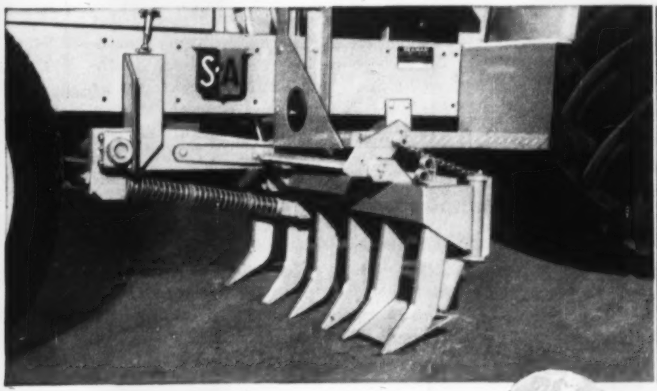
SEAMAN TRAV-L-PLANT

Today's most versatile road-building machine. Equipped with pump tachometer assemblies, volumetric meter, spray bar to apply bitumen or water simultaneously with mixing-in-place operations. Also available with new UNDERBODY SCARIFIER — for extra versatility.



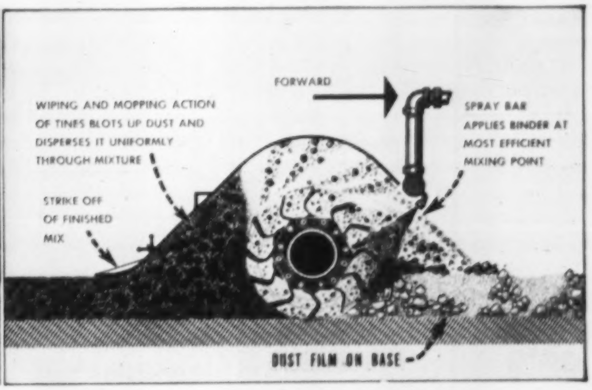
NEW S-A UNDERBODY SCARIFIER.

Mounted between rear and front wheels of the TRAV-L-PLANT, this unique new Scarifier Attachment can often be used for light scarification and frequently in the same operation with mixing and binder application, depending on conditions. Easily attached, it adds one more operation to the TRAV-L-PLANT efficiency.



S-A SPRAY BAR AND MIXING CHAMBER

Illustration shows location of spray bar just ahead of tines on TRAV-L-PLANT. Binder is instantly mixed without any opportunity for run-off or migration. Notice blending of fines and coarse with aggregates interlocked to correct segregation.


FORWARD
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SPRAY BAR APPLIES BINDER AT MOST EFFICIENT MIXING POINT
STRIKE OFF OF FINISHED MIX
DUST FILM ON BASE

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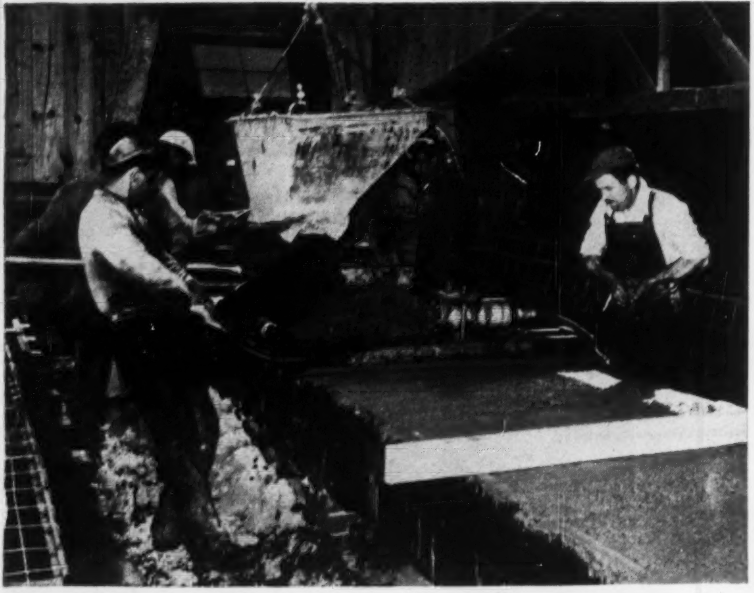


WORKMEN ARE SHOWN vibrating concrete in thin-shell precast roof panels using Viber Model PX pneumatic vibrator mounted on screed.

Contractor Casts 2-Inch Reinforced Roof Panels with Special Screed Using Viber Standard External Vibrator

• **Contractor for more than** 740 precast, thin-shell roof panels for an earthquake resistant reservoir at the new San Pablo Filter Plant, El Cerrito, Calif., devised an efficient method of vibrating reinforced concrete webs only 2 inches thick.

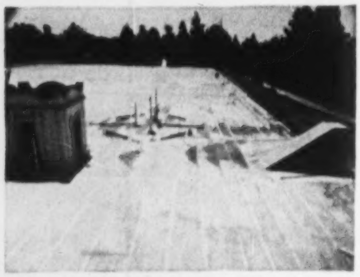
P. Grassi-American Terrazzo Co., San Francisco, developed a screed on which a Viber standard Model PX pneumatic high speed vibrator was mounted. Thus concrete was screeded and vibrated in one operation.

Precast panels were 24 ft. long by 4 ft. wide with webs 2 in. thick. In addition to being thin in section, webs were reinforced with welded wire fabric making these areas virtually inaccessible to internal vibration. This made external vibration necessary.

Following proper curing, panels were hoisted by crane and placed on girders also precast by the contractor. Dimensional accuracy of precast panels was good, facilitating placement which was done at the rate of 10 panels in less than one hour. Panels were then welded to inserts in girders to make structure solid.

Viber's Model PX concrete vibrator selected by the P. Grassi-American Terrazzo Co. is used widely in pipe yards and tunnel lining operations wherever reusable steel forms are set up for use on a production basis.

For further information on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 7-A, 726 South Flower Street, Burbank, Calif.



PRECAST ROOF PANELS shown welded in place were set on girders by truck-crane. Channel side is 8 inches deep and has shelf to retain grout seal.

CONCRETE VIBRATORS SINCE 1931

tion on the Little Tennessee River for Aluminum Company of America. At year-end the dam and 50,000-kw powerhouse were progressing toward completion in 1957. The project will be tied in with TVA's power system.

• **Southeastern dams—Demopolis lock and dam** on the Tombigbee River in Alabama was substantially complete at the end of 1955. It cost $20 million. The lock was placed in operation last August.

Warrior lock and dam, on the Warrior River (also Alabama) is just over 12% completed. The access-road and excavation work are done; the major contract for lock construction is but 10% finished. Total cost of the project: $14.6 million.

Jim Woodruff Dam, on the Apalachicola River in Florida is 90% completed overall with work still underway on its gated spillway, powerhouse and switchyard. It is a $46.4 million project.

The $38 million **Buford Dam** on the Chattahoochee River was brought to 65% completion in 1955. The earth dam, with its spillway and other hydraulic works, is finished; the powerhouse and electrical appurtenances are but 30% done.

Fort Gaines lock, dam and powerhouse, on the Chattahoochie River between Alabama and Georgia, was a 1955 construction start. Ground was broken in October on what is estimated to cost an eventual $86.4 million. The project is a unit in the over-all plan for 9-ft navigation from the Gulf of Mexico north far as Columbus, Ga. Scheduled to be completed in seven years, it will have a 692-ft-long spillway a maximum of 115 ft high. Its four hydroelectric units will total 130,000 kw.

• **Florida flood control**—The largest pumping station of its type in the world was completed in 1955, largest of nine eventually to be built on the **Central and Southern Florida Flood Control Project.** Its six 10-ft dia. pumps can move more than 2,000,000 gpm from an agricultural area west of West Palm Beach. During 1955, in addition to the pumping station, the 15,000- sq mi project saw completion of six miles of canals, 67 miles of levees and three control structures. At the start of 1956, work is being pushed on 48 miles of levees, four pumping stations and one control structure. Since work on this state-federal project began in 1950, Congress has appropriated $29.3 million to the Corps of Engineers for its share. The Central and Southern Florida Flood Control District, a state corporation created by the state legislature, has spent some $7.4 million. The state agency puts up 15% of construction costs; land, right-of-way and relocation costs handled by the state bring its total share in the project's cost to about 40%. Completed works are to be operated and maintained by the state. Eventual cost of the project is to be over $200 million.

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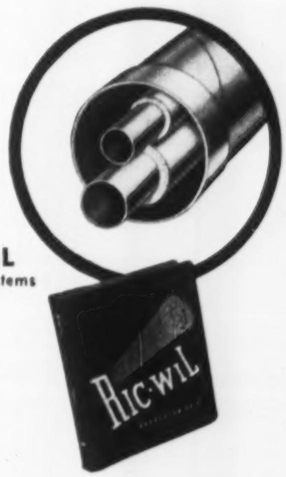

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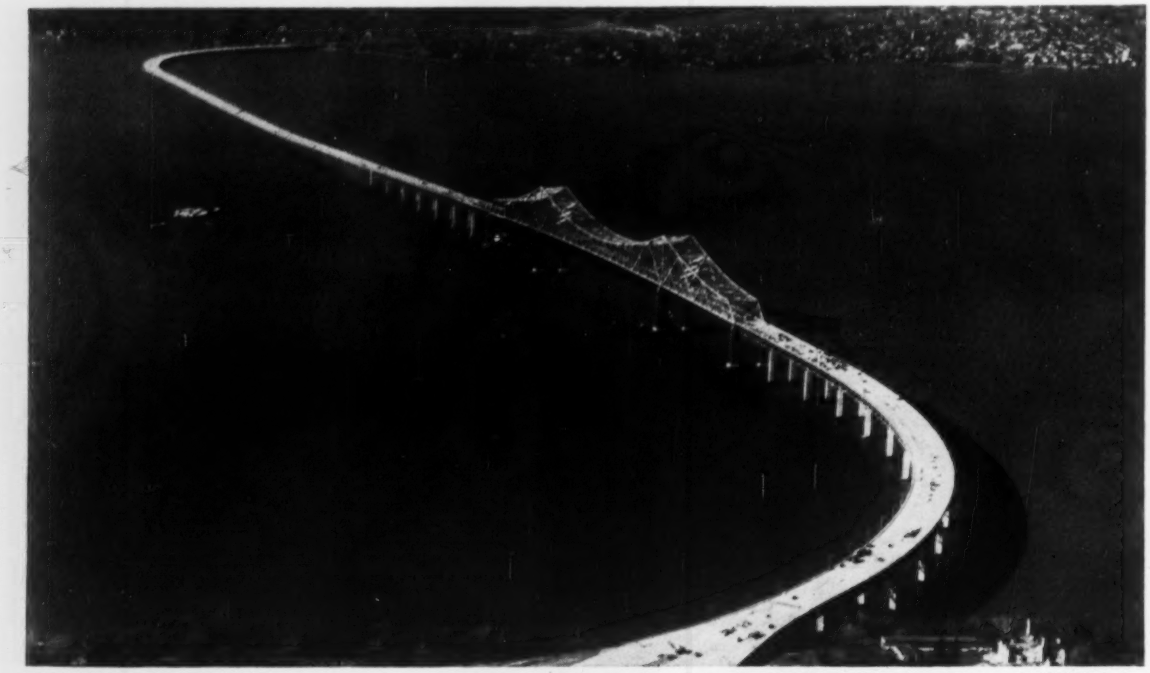


CURVING GRACEFULLY across one of the widest reaches of the Hudson River, the New York Thruway Authority's 15,300 ft long Tappan Zee Bridge, with its six traffic lanes, provides the main link in the state's 427-mile Thruway system, brought the completed superhighway to within three miles of New York City limits by the end of 1955.

Highway Debate Masks Real Progress

Although it tended to be obscured by a political atmosphere that manifested itself in a curious vacuum of leadership and willingness to accept public responsibility, there was real progress in the field of transportation in 1955.

The salient fact that stood out of a review of the year's activities seemed to be that nothing was done—but that wasn't true. It was true, certainly, that President Eisenhower's "Grand Plan" for highways—hailed as a $100 billion solution to the nation's admitted highway ills—got nowhere at all. The plan foundered on the twin rocks of doubt as to how to finance it, and on a complete lack of political leadership that was needed to push the program—or some program—through the national legislature.

But it wasn't such a resounding failure as the foregoing would make it appear. The President's plan and the ensuing discussions evoked a national "great debate" on highways such as has not been seen in the United States in many decades. Thus, more ordinary citizens were made conscious of the problem, and began giving it intelligent and informed attention, than at any time since the advent of the gasoline-engine put individual transportation in the hands of most Americans.

And while the debate went on, highway officials, engineers, contractors were busily at work, adding many miles to the nation's network of roads; building a number of major bridges; pushing through three major vehicular tunnels; carrying out probably the biggest full-scale test of highway endurance conducted to date.

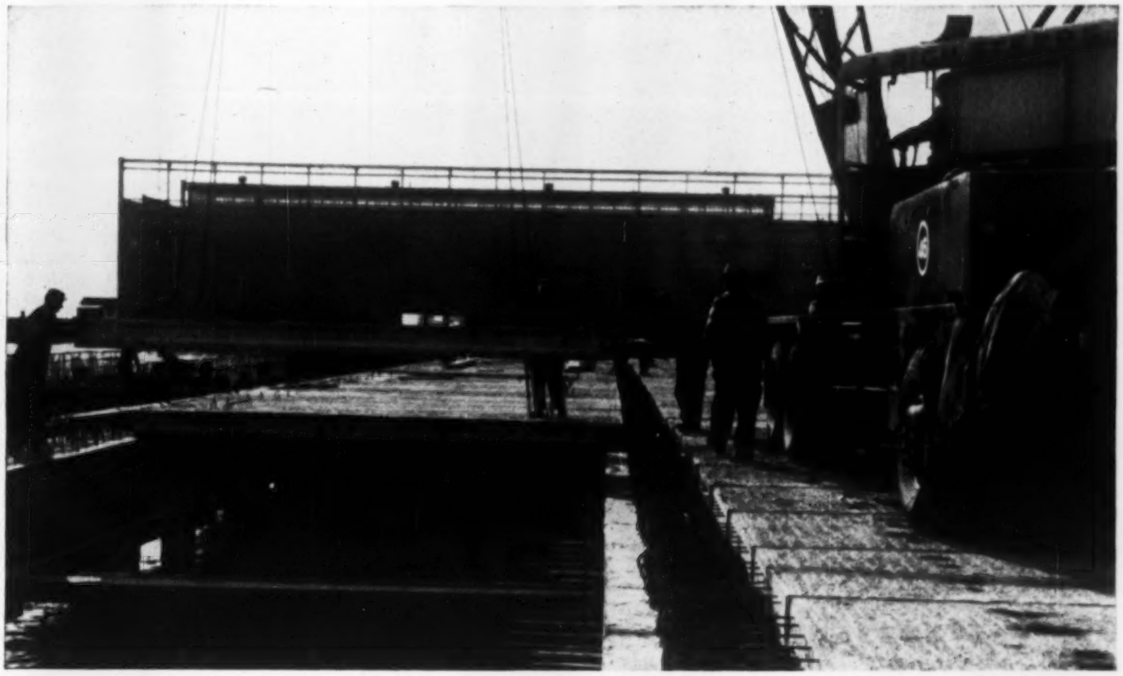
Other fields of transportation were much less spectacular than highways, although there was an unquestioned spectacular quality to the railroad reconstruction detours in the flooded New England region. And while there was comparatively little action, there was a flurry of planning in the fields of ports and harbors and water transportation, as well as pipelines.

A few areas—notably the New York—unveiled ambitious plans for rehabilitation of their port facilities, though almost no actual work started. Except for the St. Lawrence Seaway, little new work was reported on the inland waterways system; pipelines were few, though very long.

And in airports, even planning was absent—excepting again in New York City, where a new terminal concept came forward. Some observers were inclined to believe that the delays in airport work were in part traceable to aircraft manufacturers: Many a community hesitated to commit itself to major airport work without a better idea of what future planes might require for runways, pavement, lighting, hangars and repair facilities.

• Grand Plan goes under—Taken in order, the reasons for the failure of the president's highway program—or any other national-policy change in this field— are worth close attention.

Briefly, what Mr. Eisenhower presented to Congress, was a carefully thought out program developed by a special committee headed by



PRESTRESSED DECK is a major feature of a 700 ft long by 323 ft wide pier being built for the Port of New York Authority as part of its development of the port of Hoboken, on the Hudson River. Precast stringers, 5 ft wide and 1 ft deep, spanning 21 ft. 6 in. between pile caps, were pretensioned, 320-ft long pile caps post tensioned.

in Field

Gen. Lucius D. Clay, long an outstanding engineer and military leader. The plan called for construction expenditures of about $100 billion on the nations total highway net over the next ten years. Of this amount the federal government could assume the $25 billion cost of the 40,000 mile interstate system.

Immediately, there was a snag—and on that the whole program later foundered. The snag was financing. Where would the federal government—already within uncomfortably close proximity of the $288 billion debt limit, and trying to make good on a campaign promise of a balanced budget—get the funds to finance such a program?

Clay's committee had an answer—one that seemed logical to many financial people, and in fact is quite common on lower governmental levels: Bond financing. An "authority" would be created to manage the federal contribution to highways, issuing bonds secured by the federal gasoline taxes.

Politics aside, a deep-rooted objection to what many considered financial manipulating—to put the road work outside the public debt and thus make it appear by bookkeeping that the country was operating on a balanced budget—was the real barrier. As a result the Administration's bill made no progress in Congress. A few other bills calling for other means of financing were considered, but none received the approval of both houses of Congress.

During the months that Congress was adjourned some new proposals were developed, notably that of the Western Association of State Highway Officials (ENR Sept. 15, p. 24). It spreads the work over 15 years, and calls for increases in federal motor fuel taxes and the issuance of some bonds backed by these taxes if necessary.

• Bridges and tunnels—But while this debate continued (and it will undoubtedly get hotter this year) actual construction went ahead at a tremendous rate. Probably most spectacular facet of the construction appeared in major over-water connections.

At least 11 major bridges were under way or well out of the planning stage at year's end—one of them, New York's huge Tappan Zee Bridge, a major link in the state's nearly-completed Thruway, was opened to traffic.

Two others—the Pennsylvania-New Jersey Turnpike connection across the Delaware River at Edgely, Pa., and the Delaware River Port Authority's $90 million suspension span just south of Philadelphia—were almost ready for business. And a third, the 25-mile causeway-bridge across broad, shallow Lake Pontchartrain connecting New Orleans with the Louisiana hinterland, was almost ready also.

Meanwhile, other work pushed ahead. In the cold waters of the Straits of Mackinac, builders have succeeded in putting down the deep foundation for the huge suspension bridge that will form the main part of the four-mile crossing of that channel; in the warm muck of the delta land at New Orleans, caissons were going down for a major cantilever truss bridge that would provide connections further south; at Pittsburgh, a new "Point" bridge to connect city expressways with roads designed to disperse traffic fast was rapidly taking shape; New Jersey was nearly finished with its 6,500 ft Newark Bay bridge, an extension of the New Jersey Turnpike to connect it with the Holland Tunnel.

The year's work included three vehicular tunnel jobs—like the bridges, covering a wide range of engineering

Photo by Lloyd Spanhower

CONGESTION RELIEF for downtown St. Louis is promised by newly completed Third Street Interregional Highway, which will become part of the proposed Ozark Expressway, entering the city from the south. Three planned radial expressways will converge in downtown area at top left.

practice. Two of the tunnels— geographically close and being built by the same prime contractor—were the tubes at Norfolk and Baltimore, both being built by sinking prefabricated tube sections into prepared trenches. The third was the Port of New York Authority's third tube for the Lincoln Tunnel—unique in that its shield-protected heading is being driven from only one end. Advancing at a steady rate of about 14 rings a day, the 37-ft diameter tube had reached the New York City bulkhead line by the end of December.

And there was of course, no lack of ambitious planning.

In New York, the Port of New York Authority announced a $379 million program for adding to the big city's connections with the surrounding areas: This to include a $200 million, 2,400 ft suspension span across The Narrows (between Upper and Lower New York Bay); and a $93 million suspension bridge across the East River east of the existing Bronx-Whitestone Bridge.

California's legislators planned big too, authorizing a $47 million crossing to parallel (and match architecturally) the existing Carquinez Straits Bridge; and another structure to cross Suisun Bay to the south, all in further attempts to ease the growing traffic bottleneck caused by the broad waters and many arms of the inland sea known as San Francisco Bay. Studies were still under way on how best to supplement the existing San Francisco-Oakland Bridge with a new crossing.

• **Pikes go rolling along**—The turnpikes continued to blossom—on the nations highway maps, but not on the planner's boards. The financial auguries weren't considered to be too good for many of the dreams of a few years ago.

But on the side of actual construction, there was real progress.

Ohio's 240-mile Turnpike No. 1 was completed and opened to traffic exactly on schedule; New York pushed its 460-mile Thruway (thanks to the completion of the Tappan Zee Bridge) to within three miles of the New York City boundary line; Kentucky completed a 40-mile turnpike between Louisville and Elizabethtown; Maine put a 62 mile extension of its turnpike into service between Portland and the capital at Augusta.

In Massachusetts, the long-planned east-west turnpike was finally rolling and rolling fast; Indiana pushed hard on a link that would make it possible to run from the edge of New York City to Chicago without a crossroad or a stop light; Kansas started work on its turnpike between Kansas City and the Oklahoma border.

Florida finally has begun work on its "bobtail" Miami-Fort Pierce turnpike, and in Texas, construction has started on a 30-mile toll pike between Dallas and Fort Worth.

There were also other accomplishments on the side of actual work.

Oregon's 30-mile Fruitland-Salem thruway (which connects with a 9-mile bypass around Salem—the state's Capital) was completed.

Los Angeles opened another three-mile addition to its proposed 23-mile Harbor Freeway—this one an outlet for traffic heading south. And then the city turned on its own creature and made a serious study of why its freeways just keep getting more crowded, and don't provide the traffic relief they were planned for.

New Jersey added a third lane in each direction to a heavily travelled section of its Garden State Parkway as traffic volume rose far above expectations. For a similar reason third lanes were added to 61 miles of the New Jersey Turnpike.

On the planning side, Ohio went ahead with studies of two more turnpikes—these to criss-cross the state from North to South; Michigan planned added work; Connecticut—despite the threat of a taxpoyers' suit over use of materials for paving—went ahead with plans for the Greenwich-Killingley expressway, recently named the Connecticut Turnpike; Rhode Island pushed ahead with a large con-

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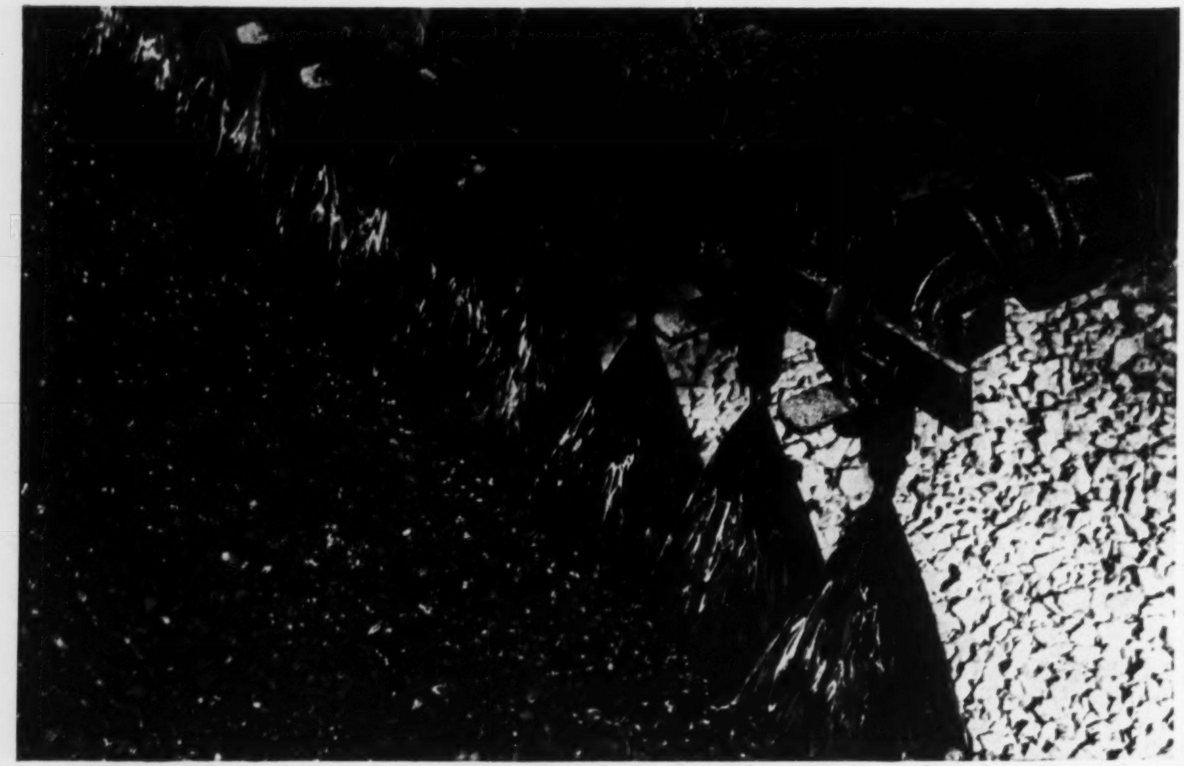

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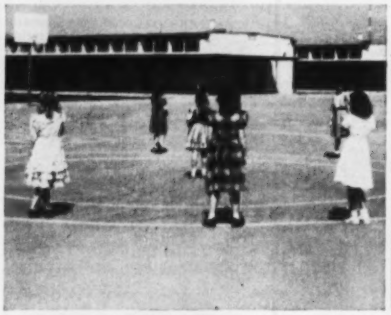

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necting roads program; New York selected a right of way for its planned Berkshire Thruway (to connect with Massachsetts' toll road); and Florida, after considerable discussion, decided to extend its turnpike. Finally the three toll road plan in Illinois, including 193 miles of route to cost $415 million, was cleared of legal obstacles, making the bonds acceptable to the underwriters and permitting design work to start.

• **Airports**—In the field of air transport, the developments were mostly in the talking and planning stage.

One major air terminal structure was completed during the year—a unique triple-domed building at St. Louis' Lambert Municipal Airport, in which the "domes" are formed by pairs of intersecting concrete barrel arches.

Three other major airport jobs—all of them military—about clean up the important work on construction for 1955. These included the Air Force's jobs at Fort Crook, near Omaha, Neb., at the old-time Army base at Plattsburgh, N. Y., and at the Homestead, Fla., base where a huge new apron is being added.

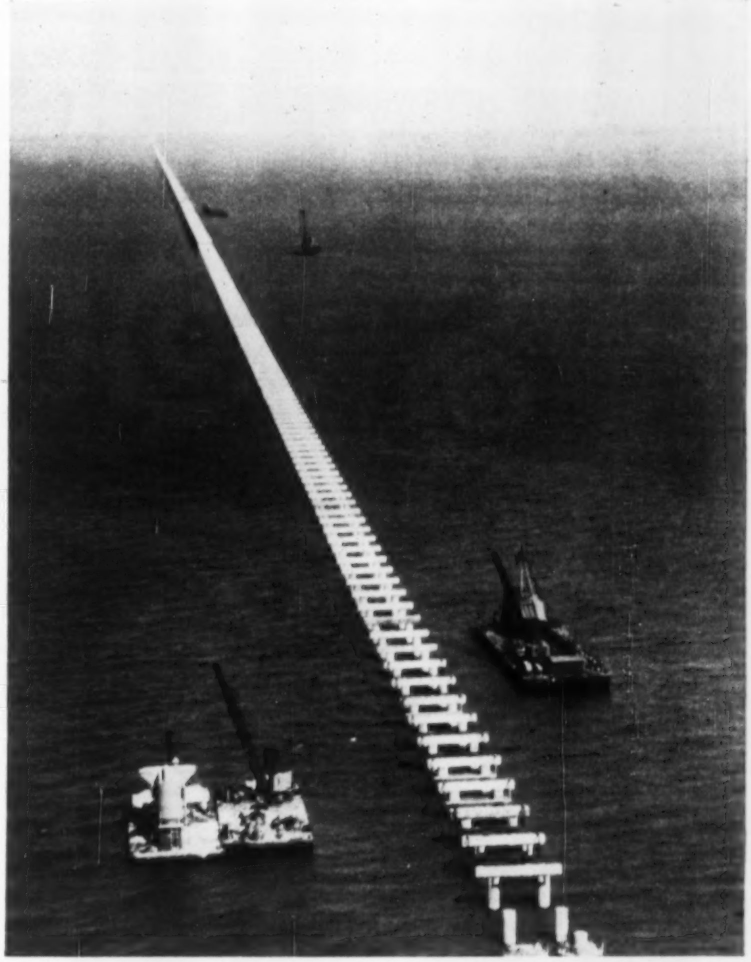
Progress will also be recorded this year at New York's Idlewild Airport where the Port of New York Authority has just begun construction of a passenger center. Unique for American airports, its plan will eliminate the heretofore standard central terminal building. Instead, there will be eight individual terminals—one for each domestic airline and one for foreign airlines—arranged in a circle around a central parked area reached by roads brought under the runways and taxiways.

• **Railways**—Almost buried under the fanfare of publicity on highways, the railroads of the nation kept at work improving their systems and their rolling stock in an attempt to remain in a competitive position. Principal exception—and a big one—was the major reconstruction task faced by the New Haven and the New York Central as a result of the Northeast floods.

Elsewhere, major structures worked on or completed, included the New York Central's huge lift-bridge over the Harlem River to replace an ancient steam-powered swing structure; and a 1,200 ft through-plate girder, single track crossing of the James River near Snowden, Va., for the Chesapeake and Ohio Railway Co.

• **Trucks and highways**—An important event in the field of highway transport was publication of the findings of flexible-pavement test programs conducted over a period of 14 months on specially built pavements near Malad, Idaho (ENR Oct. 27, p. 21). In general, the findings confirmed the widespread belief that pavement damage increases as truck loads increase. On the other hand, the tests showed the design standards widely used in the western states are adequate for the legal load limits in those states.

The tests also demonstrated the superior performance of a 4-in. bituminous concrete surfacing as compared to 2 in. of the same material due to the slab strength developed by the thicker surfacing. Another important finding was that paving the shoulders of a flexible pavement adds materially to its load-carrying capacity.



24 MILES OF PRECAST, PRESTRESSED CONCRETE will bridge Lake Pontchartrain, just north of New Orleans. The structure will carry two lanes of toll-paying traffic on a $39 million project, now expected to be completed next August.

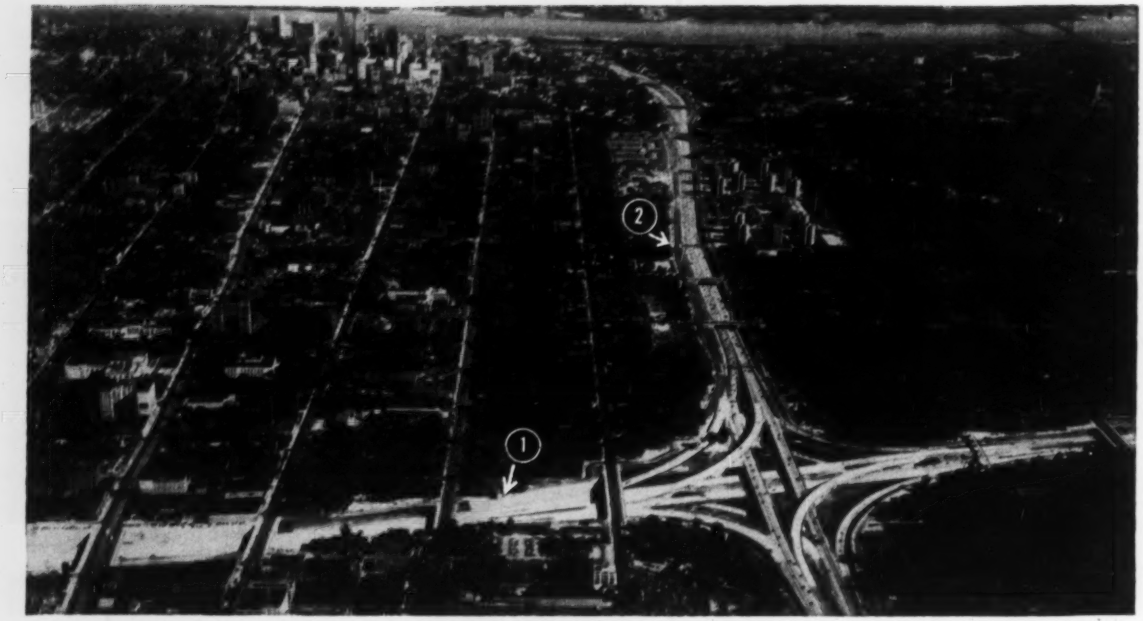
• **Equipment**—On the subject of machinery and equipment for construction, the "horsepower race" seemed to be over.

Last gasps of the race for more power seemed to be Caterpillar's huge D-9 crawler in the 290 hp field, and Euclid's even bigger "twin-Euc", up in the 370 hp range. It was clear enough what was ending the race, at least for the moment: There is a point of diminishing returns with existing diesel power sources. That much was clear at a spring meeting of the Society of Automotive Engineers, where machinery designers pointed out that a compromise must be reached between the size and power built into a machine, and the ability of an operator to handle the machine efficiently.

During the year, of course, many improvements were introduced—but they were just that, improvements, not new machines.

• **Mass transport**—Approaches to the problems of transit within urban areas were many and serious—and revolved mainly around the question of what to do with private vehicular traffic after it had reached the city areas.

Solutions—or attempted solutions—in most cases were centered on some



IN DETROIT the John L. Lodge Expressway (2) extending to the downtown area has 5.4 miles in service now; will add 2.0 miles more this year; crosstown Edsel Ford Expressway (1) now has 5.9 miles carrying traffic, will be 1.3 miles longer by the end of 1956.

DALLAS DOES IT with its 11.9 mile-long expressway, now being lengthened by 5.3 miles of fully controlled-access six-lane roadway.

means of getting the cars off the streets in downtown areas: Chicago was building a series of downtown garages, San Francisco built several, New York planned some, and cleared other space for ground level, but off-street parking. But Los Angeles, studying the effect of its partially completed expressway system, discovered a sad fact: Expressways, and the promise of facilities for parking only encourage more and more people to bring their vehicles downtown. The result is further congestion, further loss to transit facilities.

Perhaps the most unusual approach to the problem was taken by a special committee of engineers and businessmen, under chairmanship of Abel Wolman, in a report to the Mayor of Baltimore.

Said the Wolman group, in effect: Private automobiles must also be considered part of the mass transportation system. If that is done, then a city like Baltimore might consider setting up an overall authority that would have jurisdiction not only over busses, streetcars and other such transit means—but also over street construction, parking regulations and the like. Then by setting up "terminals" (parking areas) at proper points drivers can transfer from car to bus or train just as they now transfer from one line to another in a bus or railroad terminal. What's needed is a proper look at the whole picture, said the group, not at isolated pieces of it.

(Major Projects start on page 146)

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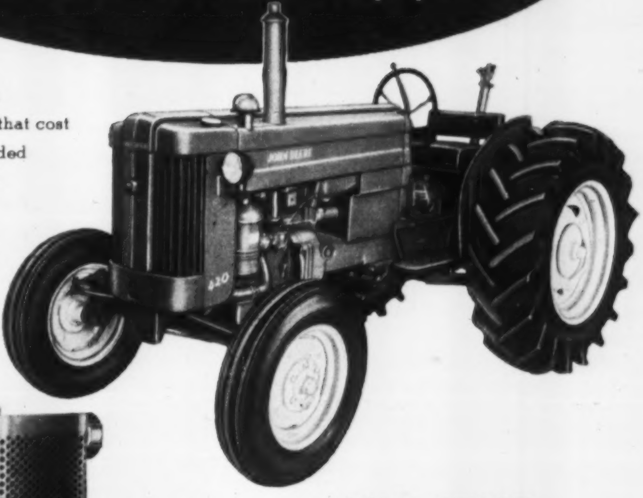

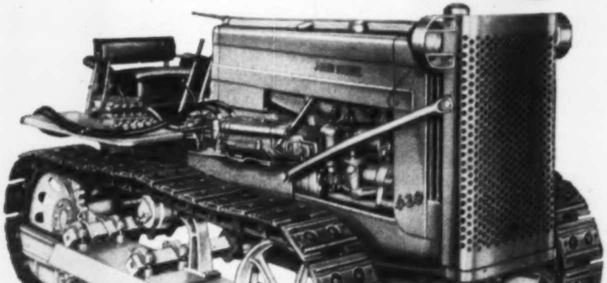

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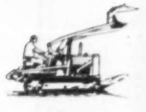
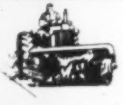
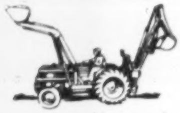

LOADER

MOWER


ROTARY SWEEPER

MATERIALS HANDLING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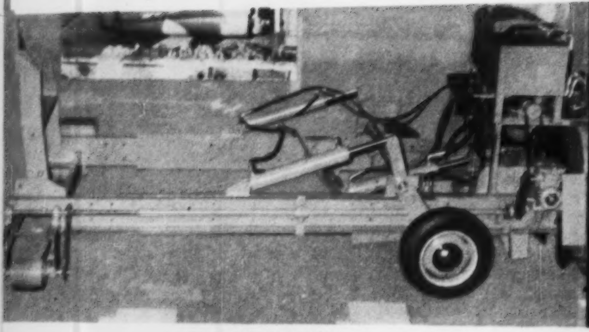
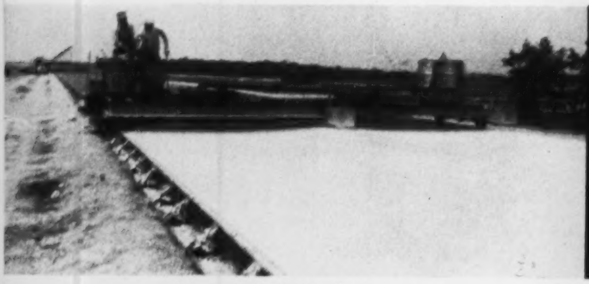
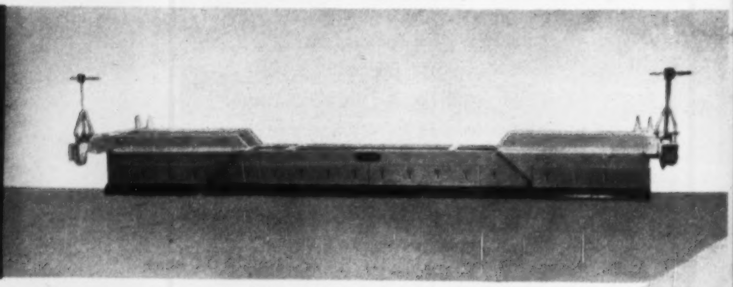


Automatic Curb Builder

Self-Widening Finisher



Automatic Curing Machine



Subgrade Planer

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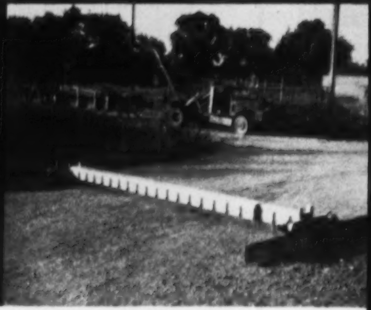

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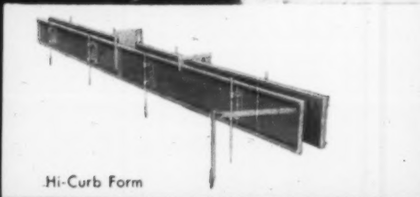
Double-Purpose Airport Form

(Prototype) Spreader

Bridge Finisher (self-widening)



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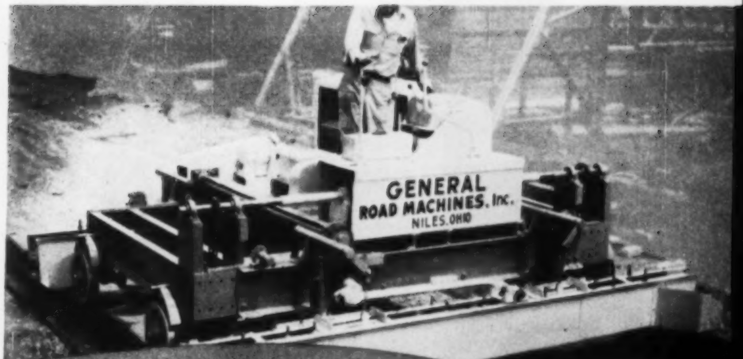

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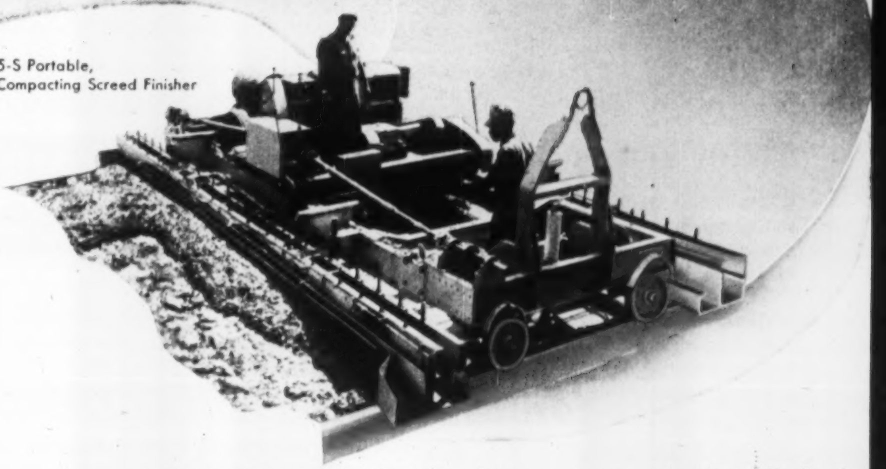
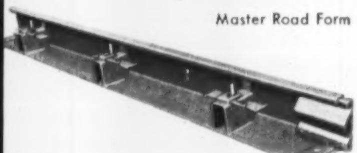
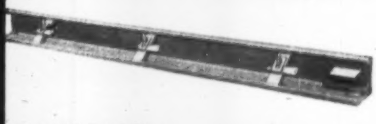


5-S Portable, Compacting Screed Finisher



Master Road Form



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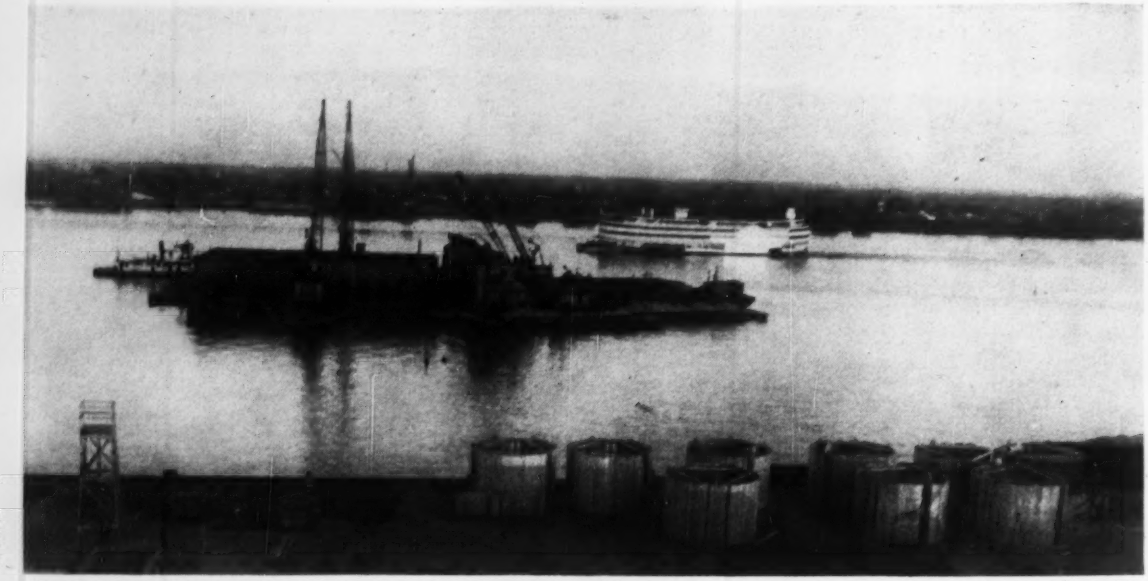


COFFERDAM GOES DOWN in the Mississippi River at New Orleans, to form Pier 2 of a $65 million toll bridge project. Two floating concrete plants supply weight while two derrick boats work on open-well dredging on an around-the-clock work schedule.

Major Transportation Projects

• **Maine Turnpike Extensions**—At year's end, motorists were already using the 62-mile extension of the 'pike from Portland to Augusta, the state capital.

• **Massachusetts Turnpike**—With 100 percent of contracts let on this 123-mile toll highway, bisecting the state from the Boston area to the New York State line, constructing progress was fast and continuous up to the advent of winter weather late in October. The $239 million estimated cost may be cut slightly by advantageous bidding, and engineers are confident of completion by the scheduled date of November, 1956.

• **New Hampshire Turnpike**—This state was engaged, at year's end, on two separate turnpike jobs—a 40-mile road that will ultimately extend from the Massachusetts line to Concord (the Central New Hampshire Turnpike); and a 24-mile extension of the existing turnpike on the eastern seacoast inland from Portsmouth to Dover and thence to Rochester. The Central turnpike was opened for half of its length—to Manchester—last summer, and the remaining 20 miles is now 75% under contract. The 12-mile section from Portsmouth to Dover will be open this summer, the remaining distance in 1957.

• **Boston Central Artery**—A limited-access route, with both elevated and underground sections, this roadway eventually will cut through the congestion of the city's oldest commercial areas, and provide connections to arterial routes on both sides of the Charles River. Work started in 1951, and completed items to date include a crossing of the Charles, connections to the Mystic River Bridge, and connections to Haymarket Square. Latest contract to be awarded (in 1955) for a $13.6 million, 240-ft long tunnel between Congress and Kneeland streets. Largest single contract ever awarded by the Massachusetts State Highway Department, the tunnel will vary from 80 to 100 ft in width, and will carry the bulk of express traffic on the artery, while the surface route above will serve to disperse traffic bound for points in the business district.

Meanwhile, work is under way to the north of Boston on the Northeast Expressway, connecting, through the Mystic Bridge, to the central artery. The expressway will extend to connections with Route 128 and other major highways to the northeast.

• **Connecticut Expressway**—With a new completion date—Dec. 31, 1957—now set for the $398 million, 129 mile route stretching across the state roughly from southeast to northwest, Connecticut was pushing hard to get the new turnpike into service. The road will run from Greenwich, near the New York State Line, to Killingly, on the Rhode Island line, and will carry six lanes of traffic in the first section (to New Haven), reducing to four lanes and then to two toward Killingly.

• **New York State Thruway**—A total of 424 miles of the 427-mile main section of the Thruway was in service as 1955 ended, by virtue of the opening Dec. 15 of the 2.8 mile long Tappan Zee Bridge over the Hudson River between Nyack and Tarrytown. Only remaining section, before the road is in full service, is the 3 mile stretch from Yonkers southward to the New York City line, scheduled for completion this summer, after most difficult construction through a heavily urbanized area.

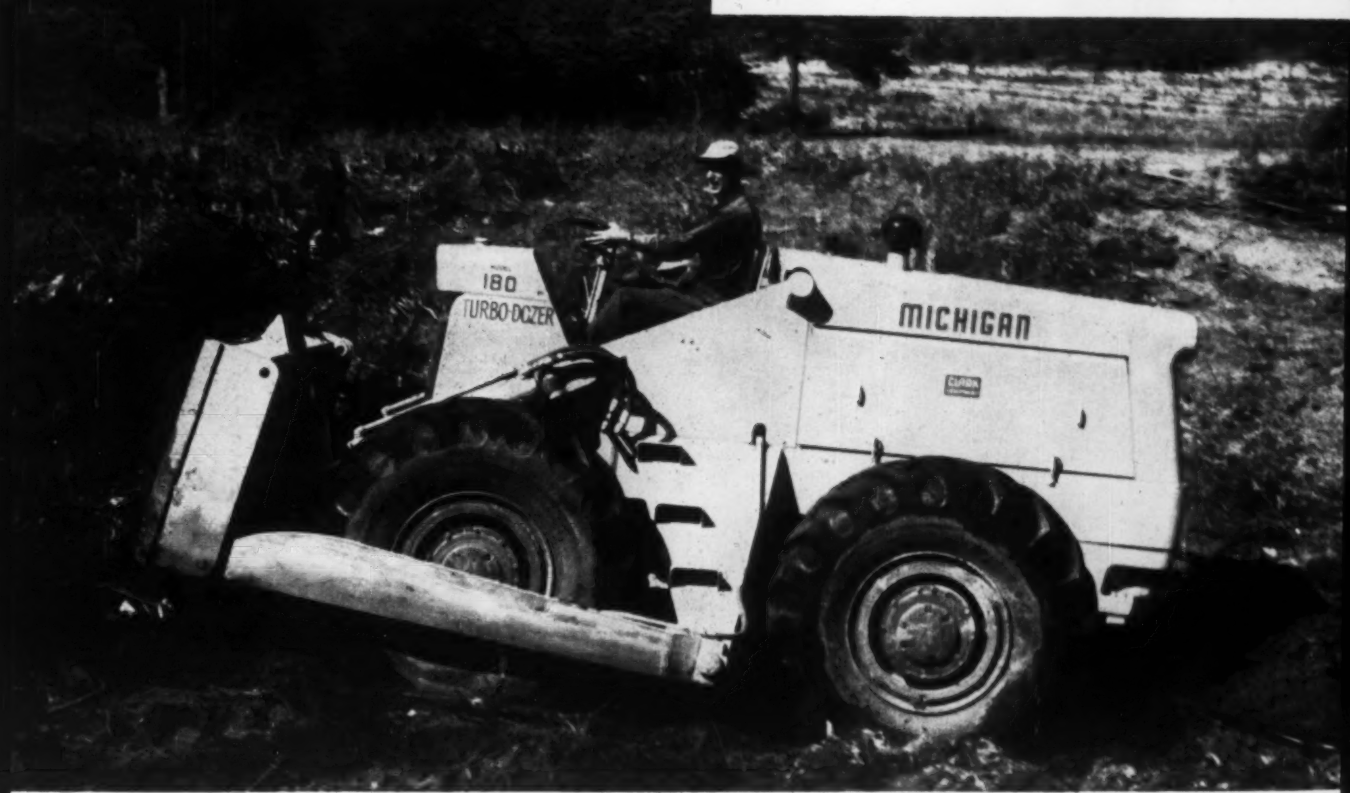
On other sections of the road, this was the status:

The route for the 24-mi BERKSHIRE THRUWAY to link the main trunk of the super-highway south of Albany with the Massachusetts Turnpike, has been selected and design is under way including that of a new Hudson River bridge near Castleton.

The 21.8 mile NIAGARA section, planned to extend from the eastern city line of Buffalo to Niagara Falls will be completed this summer, except for the sections within Buffalo city limits, where no construction contracts have been let.

Bids taken on February 2 on three contracts have now put all of the 70 mile ERIE section under contract or construction. This section will extend from Buffalo to the Pennsylvania border near Westfield, and cost about $100 million. And on the same date (Feb. 2), the Thruway authority took bids on the $111 million, 15-mile NEW ENGLAND THRUWAY that will provide a connection to the Connecticut 'pike. The new contracts put the section about 95% under contract.

• **Kingston-Rhinecliff Bridge**—At the end of 1955, substructure work for this new high-level highway bridge across the Hudson River was 95% complete, and steel



Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. At 27 mph, it runs rings around any dozer on the market!

Power-tilting bowl. A powerful double-acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. You can change the angle of the bowl from "dig" to "float" as you travel—work the cutting edge back and forth under stumps and boulders to uproot them. Two 6-inch lift cylinders give you tremendous lifting power and down-pressure—you can raise the cutting edge from 24¼ inches below ground level to 43¾ inches above.

High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up"

Full traction while turning. The Turbo-Dozer gives you full tractive effort even in a turn. *All four wheels are always driving*, except when you declutch the rear axle for highway travel. Rear-wheel steering eliminates unnecessary tire wear—you don't brake or drag your inside wheels on a turn. If one wheel begins to slip, a locking differential automatically applies power to the wheel with the firmest footing.

Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two finger-tip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

The 3-to-1 Clark torque converter gives you a steady power flow, regardless of speed. As the load gets heavier the torque output automatically increases up to 300% at stall speed—gives you the extra torque to plow through the toughest spots. You can't stall the engine, and there's no clutch to slip.

See the Turbo-Dozer movie. You can see the new Turbo-Dozer working typical jobs in a 20-minute color movie—see how it will give you faster cycles, more yardage or tonnage in every shift. Ask your local Michigan distributor to arrange a showing at your convenience—no obligation, of course. Or write direct: we'll send you a 20-page photo booklet which gives complete details on the new Michigan Turbo-Dozer.

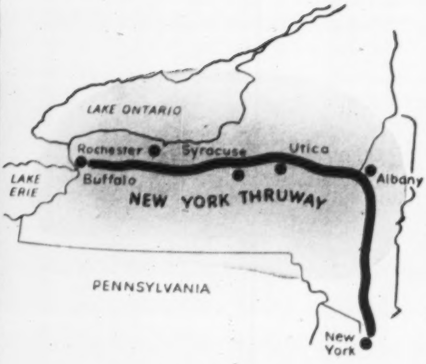
MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2401 Pipestone Road
Benton Harbor 35, Michigan

Placing an 8-ft. long section of 96-in. diameter reinforced concrete pipe in a culvert structure for Moccasin Kill under the New York Thruway in Schenectady County at Rotterdam Junction.

Backfilling operations on the completed portion of a 21-in. concrete pipe drainage system for the Mohawk section of the New York Thruway in Schenectady County near Rotterdam.



Culverts and Drainage on New York Thruway require over 175 miles of

CONCRETE PIPE

The longest express highway ever built—the 427-mile New York Thruway—reaches northward from New York City to Albany, then westward past Schenectady, Utica, Syracuse and Rochester to Buffalo. The difficult terrain necessitated cutting through or leveling hills, filling valleys and draining marshland.

Protection of the Thruway requires a complex system of culverts and drainage lines. This includes 175 miles of concrete pipe. About 600,000 ft. are used for culverts, 150,000 ft. for storm sewers and 28,000 ft. for other facilities.

Concrete pipe is an ideal choice for culverts and storm drains. Its great strength resists severe impact and sustains heavy overburdens in deep fills. Its smooth interior finish speeds drainage and provides maximum hydraulic efficiency even under the toughest service conditions.

You get more high-efficiency drainage for the money when you specify concrete pipe for storm sewers, drainage lines and culverts. Low in first cost, concrete pipe drainage systems give long years of service with little or no maintenance. These important factors add up to *low annual cost*—the true measure of pipeline economy.

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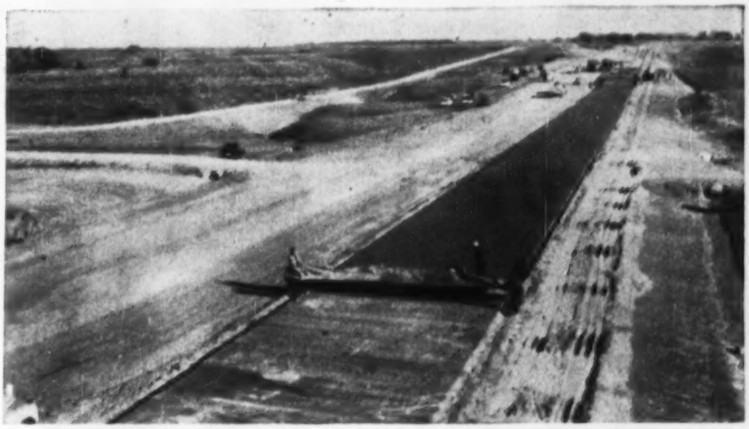
CLEVELAND'S East Memorial Shoreway along Lake Erie is now completed for 9 miles from the downtown area. It is to be extended another 6 miles.

HOUSTON EXPRESSWAY is cited as an example of the ease and efficiency of streamlining traffic flow through this Texas metropolitan center.



KANSAS TURNPIKE, linking Kansas City, Topeka and Wichita, then turning south to the Oklahoma Border, was 25% completed by the end of 1955.

erection had been started on two approach viaducts. Completion is scheduled for November, 1956. The structure will be 7,793 ft long, with continuous trusses over the river and plate girder spans on approaches, and will cost an estimated $19.3 million.

• **New York City Expressways**—The end of 1955 found large pieces of the city's multi-million expressway program opened to traffic in all or in part, and most of the rest under construction or under contract. Opened on Nov. 15 was the 7½ mile MAJOR DEEGAN EXPRESSWAY—an extension within the city of the New York State Thruway, from the city line on the north to the Triborough Bridge. Cost was $63.6 million for construction and land acquisition. Also opened on Nov. 15, was about one-third of the 5-mile CROSS BRONX EXPRESSWAY—which intersects the Deegan expressway and is designed to take traffic eastward from the George Washington Bridge, at a total cost of about $111 million. The 3-mile city section of the NEW ENGLAND THRUWAY is now about half under contract and under construction. In Queens (Long Island) the $16.4 million, 3.1 mile QUEENS-MIDTOWN EXPRESSWAY was completed and opened to traffic late in the year. The 8.6 mile HORACE HARDING EXPRESSWAY — which will connect the city (via the Queens-Midtown Expressway) with the planned LONG ISLAND THRUWAY—is now under construction, including two major bridges, one across the multi-level Queens Boulevard, and one across Alley Pond near the eastern city limits. In Manhattan, sections of the 2.5 mile, $20.4 million HARLEM RIVER DRIVE, were under construction, with more than half of the contracts still to be let. Completion is scheduled for 1957.

• **Long Island Thruway**—This $240 million road, slightly more than 100 miles long; will bisect Long Island from the Queens-Midtown Tunnel plaza on the west end to the village of Riverhead on the east. It will be made up of three pieces—two within New York City itself being the Brooklyn-Queens Expressway and the Horace Harding Expressway, already under construction. Some construction has been completed on the 8-mile section crossing

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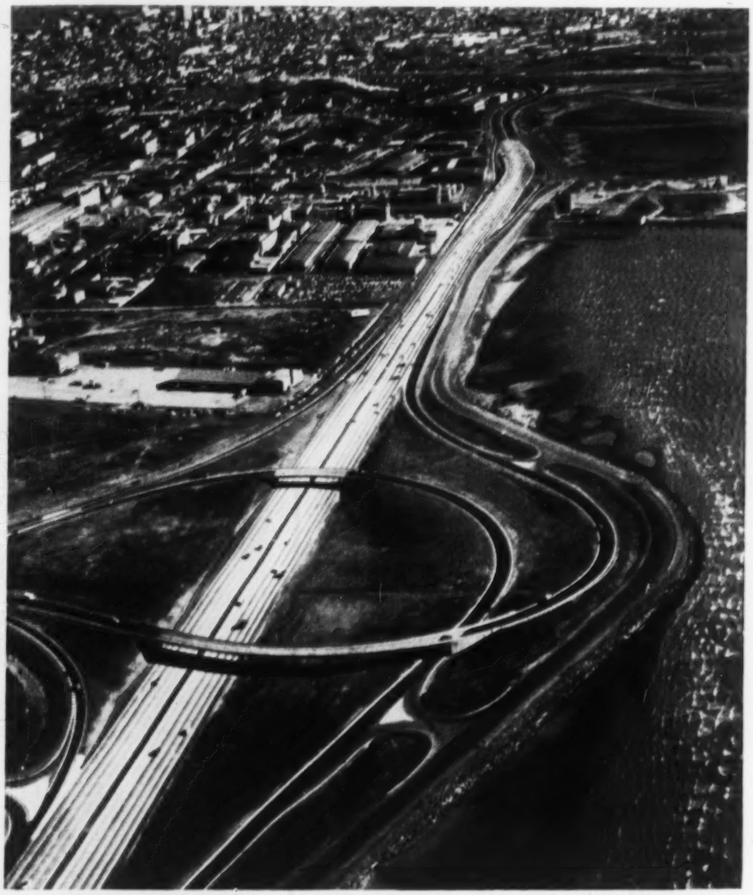

INTERCHANGE (foreground) at Ashby Ave. and East Shore Freeway, Oakland was opened last year. Skirting San Francisco Bay shore, freeway connects with Bay bridge at interchange, top center.

Nassau County, the 72-mile Suffolk County section is under design.

- **Lincoln Tunnel third tube**—As 1955 ended, sandhogs working from one heading had driven the $100 million, mile-long underwater tunnel to within a few feet of the New York bulkhead line, with a breakthrough into a completed cut-and-cover tunnel on the New York side expected within a month or two. Completion of elaborate new approaches on the Manhattan side—and of additions to the approach system on the New Jersey side—is scheduled for late in the year, with the tunnel being put in service complete by early 1957. With three tunnels available, the Port of New York Authority, the owner, plans to reverse traffic direction in the center one to accord with heaviest traffic flow.

- **Harlem River Bridge**—At year end, rail traffic was moving over both of the twin lift spans that make up the major section of the New York Central's $18 million bridge over the Harlem River, and work was beginning on complete demolition of the already partially dismantled swing span that the new structure replaces. Since the structure forms a vital part of the railroad's main line into Grand Central Terminal, five years of construction work were required as it was keyed into railroad operations, and into construction of the Major Deegan and other city vehicular expressways on the Bronx side of the river.

- **Hampton Roads bridge and tunnel**—Despite the unwelcome near visits of two hurricanes and other weather disturbances during the summer, all of the heavy prestressed concrete piles for the 9,450 ft long trestles that lead to two sand islands and the underwater section of this 16,200 ft crossing had been driven as 1955 ended, and a number of the 300-ft long steel tubes that will form the 6,750 ft tunnel section had been sunk into place in a previously prepared trench. Completion of the $100 million job (the price includes refinancing of projects in the area and a $17 million bridge over the Rappahannock River at Gray's point, now under construction) is scheduled for 1957.

• **Garden State Parkway**—All of the 164 miles of the parkway are now in service, and in fact business has been so good that part of the parkway was widened (by means of addition of a third lane on each side).

• **New Jersey Turnpike**—Nearly ready for traffic, at year's end, was the eight mile Hudson County extension of the 'pike, with its 2-mile-long high level bridge across Newark Bay. Completion of this $114 million link (which will provide better access to the Holland Tunnel) is set for this spring. Meanwhile, 61 miles of the turnpike roadway was also widened during the summer months of 1955.

Also nearly completed—with opening scheduled for 1956—is a link to Pennsylvania Turnpike at Edgly, Pa., which includes a new $27 million bridge across the Delaware River.

• **Delaware River Bridges**—At the year's end all major steel on the Edgly Bridge was in place, and paving operations had already started on approaches.

On a second structure, the $100 million Philadelphia-Gloucester suspension bridge, being built by the Delaware River Port Authority, both towers had been completed by the end of 1955, and cable-spinning has started. The structure will have a 2,000 ft main span, carrying seven lanes of traffic. Completion is scheduled for early 1957.

• **Pennsylvania Turnpike**—At the end of 1955, 42 miles of the planned 110 mile northeastern extension, from just north of Philadelphia to the Scranton-Wilkes Barre area, were in service, and contracts had been let and work was in progress on the rest of the road—one of the most difficult highway construction jobs in the east, through mountainous country and involving numerous tunnels, fills and bridge structures.

• **Florida turnpike**—The 108-mile Miami-Fort Pierce turnpike, known officially as the Sunshine State Parkway, was well under way as 1955 ended. At that point, design and plan preparation for grading and drainage was complete; for roadway base and surfacing 75% complete; and right of way acquisition was proceeding rapidly. Meanwhile, 50 construction contracts had been let—mostly for grading,

(*Continued on page 154*)

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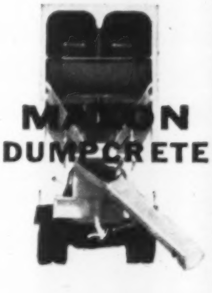

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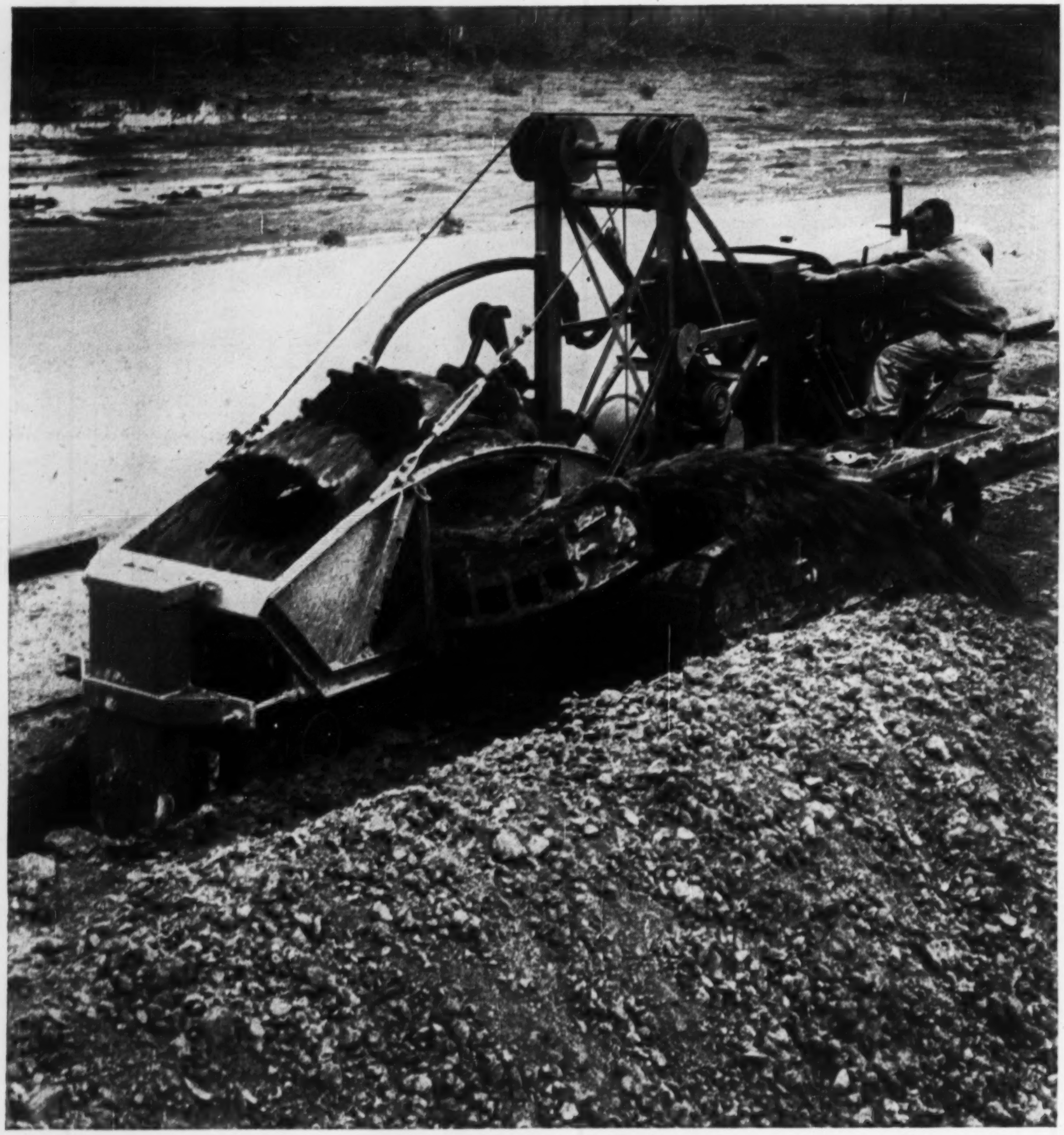

Gar Wood-Buckeye 308 digs to 5 feet 6 inches deep, with optional cutting widths from 16 to 32 inches in 2-inch steps.

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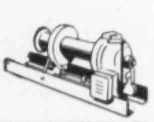
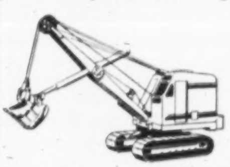


Gar Wood
Winches



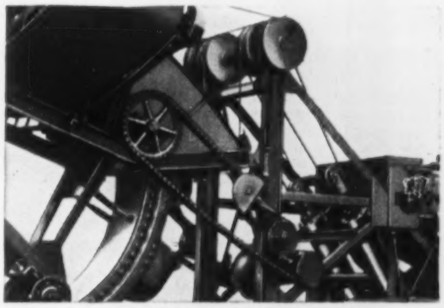
Gar Wood
Excavators

Advanced hydraulics boost production with Gar Wood Buckeye ditchers

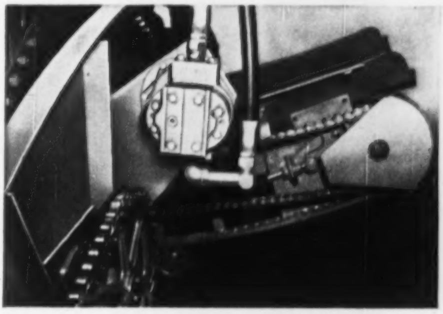
Once again, in three new job-proved ditchers, Gar Wood-Buckeye brings you advanced features that boost ditch production, cut ditching costs!

First, an *exclusive live hydraulic wheel hoist* provides faster, more accurate positioning of the digging wheel. Next, *exclusive hydraulic conveyor drive* provides three discharge speeds in either direction . . . instant adjustment to handle any volume of spoil independent of any other function. No complicated shifting, no need to stop digging wheel or crawlers. Both wheel hoist and conveyor drive are operated independently of each other and from the operator's seat. *Tractor-type crawlers* on these new Gar Wood-Buckeye models are strong and reliable . . . assure trouble-free service.

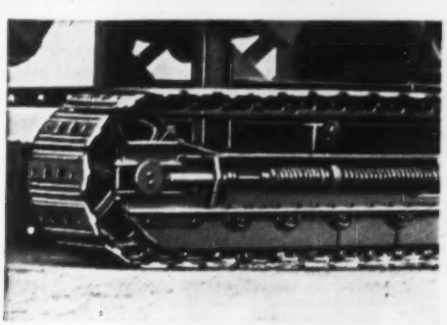
These and other Gar Wood-Buckeye features mean smooth, clean, low-cost ditching . . . more ditch per dollar with the greatest return on your capital investment. They also mean longer life, less maintenance and less downtime. They explain why contractors expect and get *more* for their money in Gar Wood-Buckeye ditchers. See for yourself by asking your dealer to show you these new job-proved models: the 305, 307 and 308. And, while you're there, find out about the full range of factory options that tailor these ditchers to *your* particular applications and digging conditions.



LIVE HYDRAULIC WHEEL HOIST positions digging wheel faster, more accurately. Digging wheel is positioned independently of all other operations. Operated from seat by simple, one-hand controls.



HYDRAULIC CONVEYOR DRIVE eliminates shock damage . . . requires less maintenance. Three discharge speeds in either direction meet any conveyor need. Completely controllable from the seat.



TRACTOR-TYPE CRAWLERS, with face-type roller seals, give long, trouble-free service life. Simplifies variation in tread width and bearing areas through a selection of pads for any type digging.

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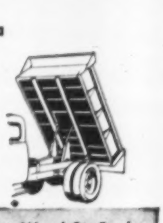

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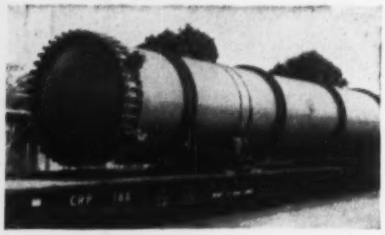

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OREGON ROUTE is T. H. Banfield Expressway, extending east from downtown Portland for 14 miles, most of the way along an old watercourse. Cost was $17 million.

drainage and bridge construction, on the $75 million road.

• **Baltimore tunnel**—This 6,300 ft crossing of the Patapsco River will be a twin-tube affair which, with its 14 miles of approach roads, will form an express route through the southeastern and eastern sections of Baltimore. With completion scheduled for late in 1957, construction of approaches to the underwater section was well under way at the end of the year, and the first of twenty-one 300-ft-long twin sections that will form the outer skin of the tubes had been floated down from shipyards and were at the site being prepared for sinking. The bottom of the tunnel will be 101 ft below the river surface at the deepest point.

• **Kentucky Turnpike**—This $38 million project extending from Louisville 40 miles south to Elizabethtown, was 81% finished, based on the dollar value of construction completed. Remaining to be completed for opening about July 1, are: 7% of the concrete roadway paving; 41% of the base and asphalt shoulder paving; 7% of the structures and 50% of seeding and sodding.

• **Indiana Toll Road**—Extending 156 miles across the northern portion of the state, connecting with Ohio's completed turnpike and Chicago's proposed Skyway toll facility, this road is scheduled to be opened to traffic in November of this year at a total project cost of $280 million. All construction will then be completed except the final 0.6 miles connecting with the Skyway for which a $2.9 million contract was only awarded in October.

• **Texas Turnpike**—Connecting Dallas and Fort Worth, this 30-mile 4-lane divided turnpike is scheduled to be opened to traffic by July 1 of next year at a total project cost of $58.5 million. The first grading contract was awarded last Sept. 21. Nearly three-fourths of the right-of-way had been secured. At the end of 1955, seven contracts had been awarded for the construction of 28 of the 56 bridges, at a total cost of $5.4 million, and four contracts had been awarded for 18 miles of grading and drainage at a total cost of $5 million.

• **Kansas Turnpike**—Extending west from Kansas City to Topeka, then southwest to Wichita and finally due south to the Oklahoma line, a total distance of 236 miles, this road was about 25% completed at the end of last year. Completion date for the $160 million toll project is October of this year. Of the 253 turnpike bridges, 37 had been completed; 60,000 tons of subbase material had been laid for the 181 miles of flexible type pavement south of Topeka; and 7 miles of two-lane concrete pavement had been completed on the 55 miles of rigid-type pavement between Topeka and Kansas City.

• **Ohio Turnpike No. 1**—Extending 241 miles across northern Ohio, connecting the Pensylvania and Indiana Turnpikes, this $326 million toll road was opened to traffic October 1 of last year and took

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TRU-STOPS have long been recognized as superior Emergency Brakes for heavy trucks and tractors. Their many advantages are now causing them to be used to brake bucket operating mechanisms, and cable drums on cranes, shovels and other construction equipment.

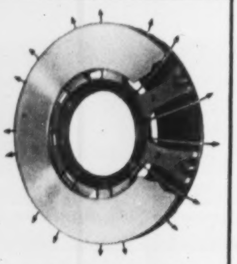
These advantages include:

Real Emergency Brakes • On motorized equipment TRU-STOPS are real emergency brakes—not just parking brakes. They serve as auxiliary brakes on long down-grades and can bring the vehicle to a quick stop if service brakes suddenly fail. They prevent accidents by insuring quick positive stops in emergency situations.

Positive Parking Brakes • TRU-STOPS hold safely on steep grades— prevent "parking brake" accidents.

Lower Maintenance Requirements • TRU-STOP design simplifies adjustment or relining, decreases maintenance frequency. In truck or bus applications TRU-STOPS are normally mounted on the drive shaft. Relining or adjustment is a simple job for any mechanic with ordinary tools. It is not necessary to drop the drive shaft.

Specify TRU-STOPS for factory installation on your next piece of equipment.



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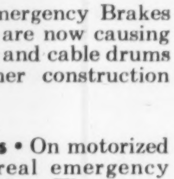
• The terrific heat generated in braking cuts lining life. TRU-STOPS quickly dissipate this heat. Most of the disc is exposed to the air even during braking. And a cooling jet of air circulates through the disc, prolongs lining life.

You will find a great deal of useful information in the booklet, "TRU-STOP Emergency Brakes." Better send for a copy today.



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in $1.9 million during the first two months of operation. This was in addition to a toll revenue of $1.1 million collected on the eastern 22-mile section which had been in operation since December 1, 1954. With its first toll road completed and in operation, the Ohio Turnpike Commission turned its attention to Turnpike No. 2, from Cincinnati to Conneaut in the northeastern corner of the state, with perhaps a Toledo-Columbus spur. Engineering reports on the feasibility, cost and earning potential of this project are being studied.

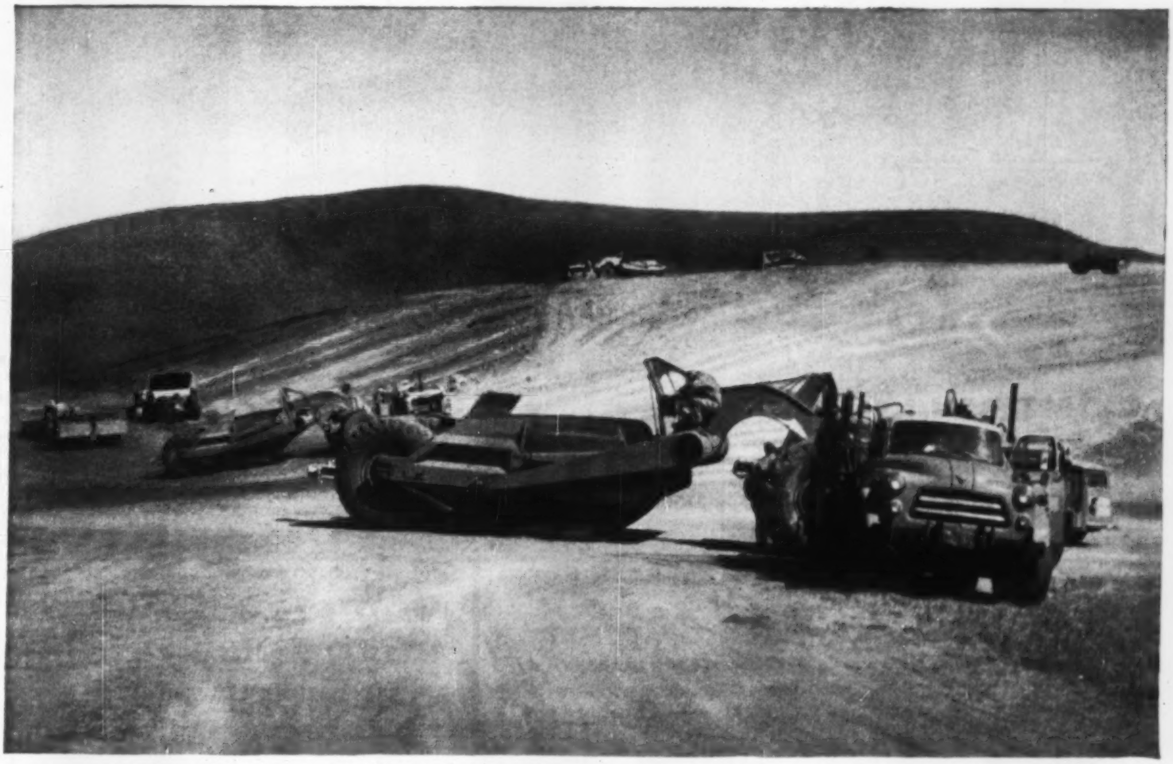
• **Chicago Calumet Skyway**—An $88 million, 8-mile toll facility on the southeast side of Chicago, this project will connect with the Indiana Turnpike and angle northwest to a connection with the proposed south superhighway route in the vicinity of State and 66th Sts. The first construction contracts are to be awarded this month. Completion date is January 1, 1958.

• **Illinois Toll Roads**—To total 193 miles on three routes in the Chicago area, these roads are now assured by virtue of an Illinois state supreme court decision in January authorizing the Illinois State Toll Road Commission to deliver the $415 million worth of bonds purchased on October 25 by a 565-member underwriting syndicate. Designs were scheduled to get underway as soon as consulting firms could be selected. The commission expects to start purchasing right-of-way by April 1 and to let the first construction contracts by July 1.

• **Oklahoma Turnpike No. 2**—This 89 mile toll road from Tulsa to the northeastern corner of the state, is scheduled to be completed and open for traffic on or before July 1, 1957. The $50-million-plus project is a continuation of the Turner Turnpike between Oklahoma City and Tulsa. Construction contracts awarded to date, totaling about $30 million, have been under-running the original estimates by about 10%.

• **Detroit expressways**—Detroit's $205 million, 23-mile expressway program reached the half-way mark at the end of last year, in mileage of expressway carrying traffic. The 9 mile $80 million north-south **John C. Lodge Expressway** whose right-of-way cost $32 million had 5.4 miles in service, with an additional 2 miles to be opened to traffic this year. New contracts will total $6.8 million this year and completion is scheduled for 1958. The $125 million east-west **Edsel Ford Expressway** had 5.9 miles open to traffic, with an additional 1.3 miles to be placed in service this year. About $15 million worth of construction will be

RADIO helps build roads, level rough country, fight fires in the California mountains



Archibald's two-way radio-equipped supervisory vehicles, and special units such as the roving greasing truck (above), coordinate as many as 12 widely separated projects with the San Carlos head office. Radio keeps all units under constant supervision, saves time, money.

J. O. Archibald Co., San Carlos General Engineering Contractor Uses G-E 2-Way Radio . . . Keeps Equipment Working A Dozen Jobs At One Time.

ORDERS from the head office of the J. O. Archibald Company are dispatched to supervisors on the job by two-way radio. Company operations, sometimes widely separated, cover the San Francisco peninsula area and surrounding mountain districts. Yet all projects are under radio direction—through two-way radio equipped supervisory vehicles.

Archibald operates under private and government contracts for road building, pipeline installation, and earth moving projects of all kinds. When needed, company equipment helps fight fires threatening vital lumber lands.

"Radio Has Paid For Itself Many Times . . ."

"Our G-E radio has paid for itself many times over", say Archibald officials. "It saves us time, is convenient, speeds parts and men to projects, permits prompt response to emergency calls." The company reports excellent coverage with low band equipment—a 60 mile average from base to car, at times up to 60 miles car to car. A remote relay transmitter atop a mountain four miles from the base station helps overcome terrain interference.

Progress Line Offers New Advantages

The new G-E Progress Line of two way radio saves money on maintenance through faster servicing, protects from obsolescence because chassis are interchangeable. Changes in frequency, power, type of reception are made quickly at a minimum cost. See your local G-E Communications Counselor for full details. Or, write to: *General Electric Company, Communication Equipment, Section X2226-16, Electronics Park, Syracuse, New York.*

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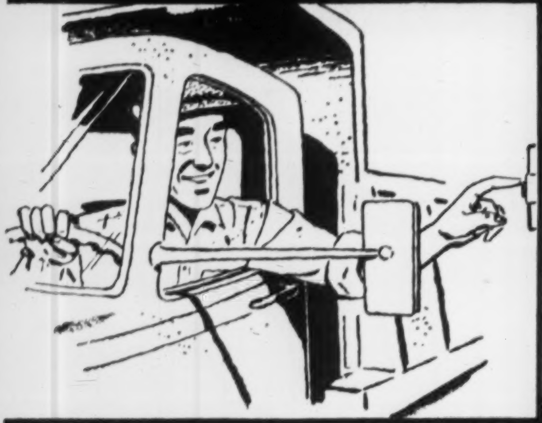
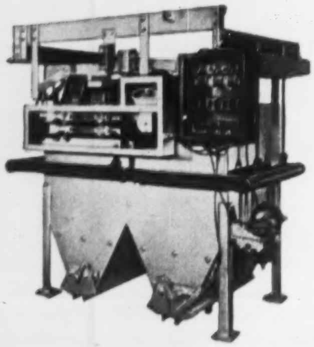


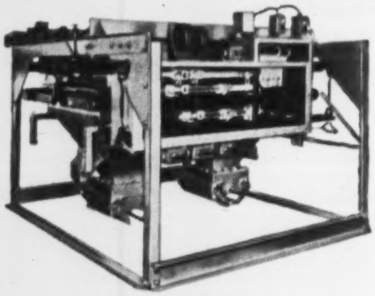
DENTON CONST. CO.

PUSH-BUTTON-CONTROLLED BATCHERS



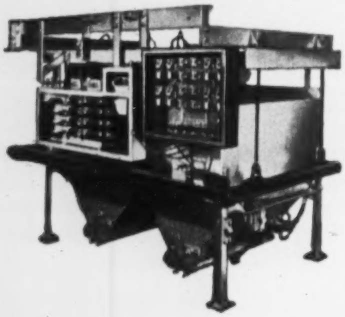
SAND BATCHER

Discharges two batches simultaneously, electrically controlled at cement batcher, by truck driver, or by operator on sand batching plant.



CEMENT BATCHER

Here one man operates all 3 units or cement batcher alone. Hoppers accurately charged by combination of rotary gate (for speed) and vane feeder (for final accuracy).



STONE BATCHER

Discharges two batches of 2 stone sizes each. Correct proportion of each size stone provided by cross feeds from each battery of hoppers.

Completely Automatic Road Builders' Plant... ONE-MAN-OPERATED

One man . . . one finger . . . one push button controls batching of sand, cement, and 2 sizes of stone — the great new Butler 0-1-0 Automatic Road Builders' Plant. Electric controls at the cement batcher operate any one, two or all three plants — maintaining performance efficiency that easily keeps up with two 34E dual drum pavers.

MASTER CONTROLS are pre-set for any selected batch proportion you need — and can be easily changed for new specifications. If the contractor prefers, the truck driver himself can actuate either the sand or stone batchers without leaving the truck cab.

World's Most Portable Plant

Another exclusive Butler engineering feature is the hinge and pin attachments for supporting columns, which permit amazing savings in erection time — and in relocation. Special electrical connectors between batchers require only quick plug-in — and you're ready to operate in your new location.

BUTLER BIN CO.
WAUKESHA, WISCONSIN

placed under contract this year compared to $7.2 million last year. This 13.9 mile expressway is also scheduled for completion in 1958. Both expressways are depressed, with a minimum of three 12-ft traffic lanes in each direction, a 14-ft median strip, two 8-ft refuge lanes, and two 30-ft surface service drives where necessary. Each expressway is designed to handle 9,000 vehicles per hour.

• **Cleveland railroad bridges**—Three new bridges over the Cuyahoga River in Cleveland, Ohio, have now been placed in service under an $18 million bridge replacement program being executed under a joint agreement between the Corps of Engineers and four railroad companies. The third structure, for the New York Central Railroad, was open to traffic last October. Three other structures now under construction had reached the following percentages of completion at the end of last year: NYC and PRR, 50%; B&O, 38% and NYC&StL, 45%.

• **Ohio freeways**—A total of 33 miles of expressways are either completed or under construction by the Ohio Department of Highways, in five major cities. Ultimately the five systems will total 63 miles. Major contracts awarded last year include three 10-mile Toledo system for about 5 miles of expressways, including 11 highway separation structures and one railroad separation structure, at a total cost of $6.9 million. In the Cleveland area an $8 million contract was awarded last year for an 8-lane viaduct over the Cuyahoga valley, as part of the Inner Belt System. At present about 15 miles of the proposed 26-mile freeway and expressway system in that area is either completed or under construction. Other major expressway construction placed under contract last year includes: Akron East, $2.7 million; Cincinnati Mill Creek, $4.0 million; and Columbus Inner Belt, $3.3 million.

• **Texas Expressways**—During its last fiscal year ending August 31, 1955, the Texas Highway Department awarded contracts for the construction of 180 miles of divided highways, at a cost of $38.4 million. During that same period 133 miles of divided highways were completed, at a cost of $27.7 million. For 1956 it is estimated that new contracts will total at least $43 million. In its long-range program, the highway department has advanced planning underway for a total of $640 million. Of this amount about $114 million will be spent on urban expressways and from $40 to $50 million will be spent on rural divided multi-lane highways.

(Continued on page 162)

Tough Contract Completed—Thanks to a Sherman Power Digger!

Mr. K. M. Johns, earthmoving contractor from Westminster, South Carolina, was in trouble. After contracting with a neighboring city to lay an eight inch supplementary water line through the center of town, he discovered that his excavating equipment was too large and unwieldy to work between curb and sidewalk. To use such machinery would have meant re-routing traffic along the entire route at great extra expense to the city.

Mr. Johns' problem was solved by the purchase of a Sherman Power Digger. Mounted on a Ford Tractor, the unit maneuvered easily between curb and sidewalk and the job was completed on time and at a profit.

Sherman Power Diggers are earning an enviable reputation among contractors for versatility, compactness and maneuverability. They dig faster . . . up to ten feet below grade in mud, hardpan, shale, blacktop, and stony ground. Sherman Diggers are sold and serviced locally by your Ford Tractor Dealer. See him today for a demonstration or write for free Bulletin No. 1431.

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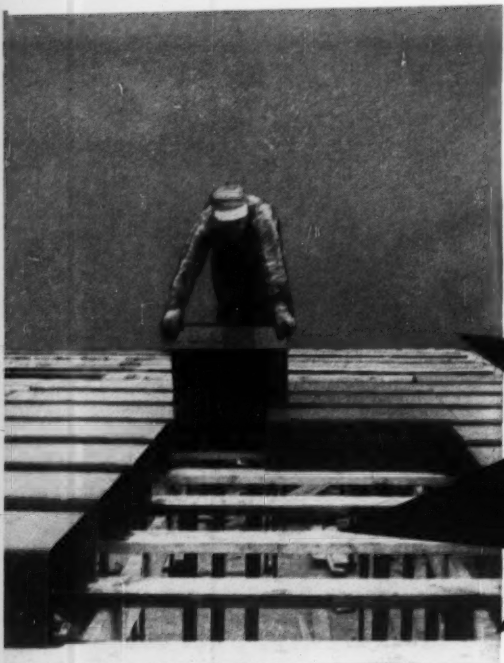
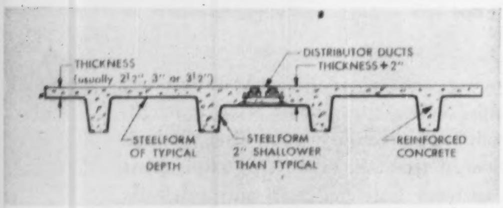
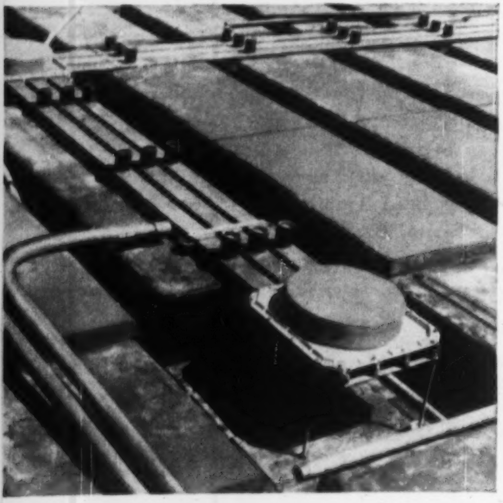


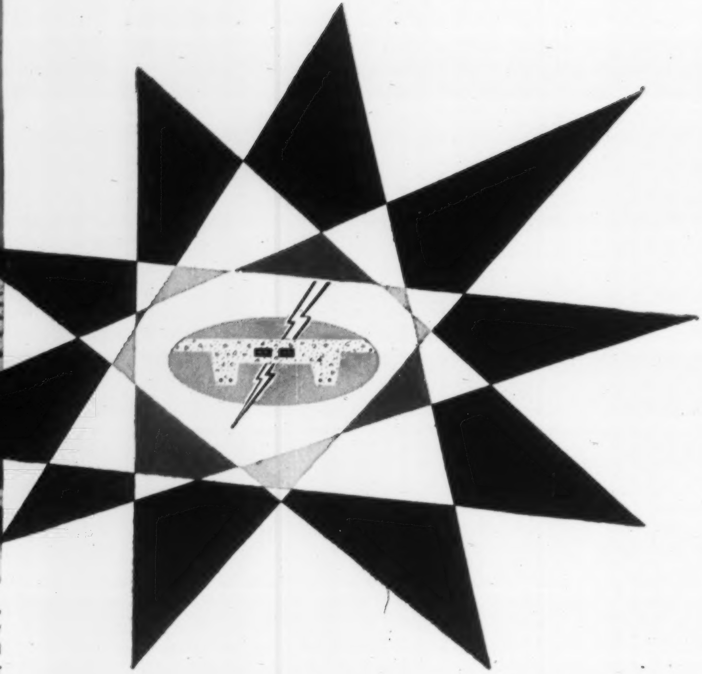
Ceco-Meyer Steelform Construction saves steel, concrete, lumber and labor. The removable steelforms are quickly installed on simple open wood centering. Cost is reduced because the same lumber steelforms are re-used from floor to floor.



Cross-section through distributor ducts, showing the strength and simplicity of R/C Duct Floors made with Ceco-Meyer Reinforced Concrete Joist Construction.



Here's a partially completed 3-duct system. The electrical ducts are installed on top of Ceco-Meyer Removable Steelforms. Concrete is poured over and around ducts. Result is monolithic floor system—no fill needed.



Electrified floors in reinforced concrete

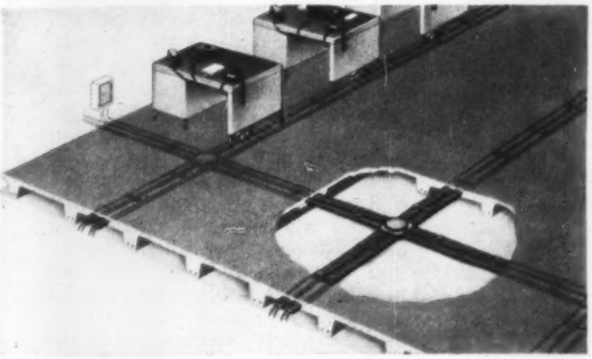
...outlets every 2 feet along ducts...

Yet the cost is 19% less...due to Ceco-Meyer Steelform Construction

One of the prime necessities in buildings today is plenty of conveniently placed electrical outlets. And the most economical way to assure electrical flexibility is to build with reinforced concrete—with R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. That's how the problem was solved at the National Education Association Building, Washington, D.C., where R/C Duct Floors actually cost 60¢ per square foot less than cellular steel flooring, or a saving of 19%. In R/C Duct Floor construction, a network of steel electrical ducts is buried in the structural slab. Capped outlets every 2 feet along the ducts provide handy electrical connections for the telephones and business machines now in use. When expansion or re-arrangement is necessary, electrical equipment can be moved anywhere without costly rewiring or tearing up floors to provide electrical outlets. On your next building project, consult Ceco Engineers. They can save you money with R/C Duct construction—at the same time you get rigid Reinforced Concrete floors.

Major Transportation Projects

World Center Building, Washington, D.C.—another structure with the economical electrical flexibility of R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. Architect: Robert O. Scholz / Structural Engineer: Otto Vogt / Contractor: R.O. Scholz, Inc.



Standard electrical distribution ducts are buried in structural concrete. No additional fill or expensive topping is needed. Electrical connections are provided as close as every 2 feet along the ducts.

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ENR

How seismic surveys saved time and money for the Connecticut Expressway

Ammann & Whitney needed to know depth to bedrock along the center of all major cuts of the 129-mile Connecticut Expressway—in a hurry. A Gahagan 4-man Seismic Survey Crew gave the answer in just 30 working days. Gahagan Seismic Crews also worked with Section Engineers Knappen, Tippetts, Abbett, McCarthy, and Loomis & Sullivan. The latter firm, for instance, used a continuous profile of bedrock elevation, right and left of centerline, to draw up definitive cross sections every 50 feet. This expedited planning by two-thirds the usual time and gave a wealth of data that would have cost about four times more if obtained by other means. Write for Bulletin 1 giving facts about seismic survey use with highways, dams, power plants, bridges and other construction projects. Address Geophysical Survey Division, Gahagan Dredging Corporation, 90 Broad St., New York 4, N. Y.

Established in 1898, Gahagan is a leader in hydraulic dredging

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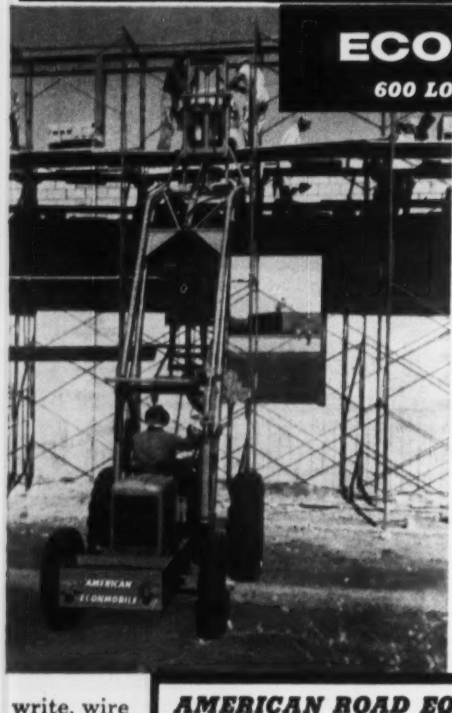
CASE HISTORY

hoisting height?

the ECONMOBILE 600 LOADER has it!



Equipped with pallet fork, the ECONMOBILE can service the scaffold up to a height of 18 feet. With auxiliary tower, it has a hoisting height of 22 feet.

The ECONMOBILE also has a long reach—up to 6 feet from wheel to heel of the fork; it has speed and mobility; and it has a 90% use factor with a wide range of attachments.

No wonder contractors report a savings on general labor of up to 70%.

write, wire
or call

AMERICAN ROAD EQUIPMENT COMPANY
4306 North 28th Street Omaha, Nebraska
Phone PLeasant 2575

• **Portland, Ore. bridge**—Construction of concrete piers in the Wilamette River for the new $8 million Morrison Street Bridge was begun in 1955. Being built by Multnomah County the structure will have a double-leaf bascule span. Contracts for the superstructure and approaches are yet to be called. The structure will replace one built in 1903.

• **Pacific Highway**—Four-laning of the Pacific Highway between Vancouver and Olympia was completed during the year, with the final 14 mi. opened to traffic as the year ended. Cost of the new 103-mi. highway, including 64 separate bridges and overpasses, totalled $41 million. First work was started in 1938.

• **Idaho bridge**—The Sandpoint bridge, across an arm of Lake Pend O'Reille, totalling 5,800 ft in length, was finished in 1955. A mile-long hydraulic fill at the north end of bridge is nearly done, but awaiting moderate weather to complete. Contract is yet to be let for surfacing approaches and bridge and to demolish the old bridge. To be opened for traffic by early summer, the bridge includes long composite piles and precast concrete deck.

• **Aberdeen, Wash., Bridge** – Work was completed at the end of the year on a $3.5 million bascule bridge for the state highway department over the Chehalis River at Aberdeen. One of the West's largest bascule bridges, each of its two leaves is 160 ft long, with a distance of 135 ft between the pivot and the center break.

• **Spokane Freeway**—Construction will continue in 1956 on a $7 million, 11.8-mile, freeway extending eastward from Spokane to bypass populated suburban areas on U.S. 10. Expenditures for 1956 are expected to be $1.5 million plus carryover contracts that would increase this to $2 million. During 1955 contracts totaling $1.1 million were awarded. The project is 35% complete in money value. Five miles of roadway outside the city limits have been finished.

• **Portland-Salem Freeway**—Oregon's 36-mile answer to traffic congestion between metropolitan Portland and the state capital city, plus a 9-mile Salem bypass linking with U. S. 99 East, was opened to traffic in October to complete this $12 million major post-war project. Still projected is a tie at the Portland end which will permit traffic bound for the state of Washington to slip along Portland's waterfront thruway system and bypass midtown congestion.

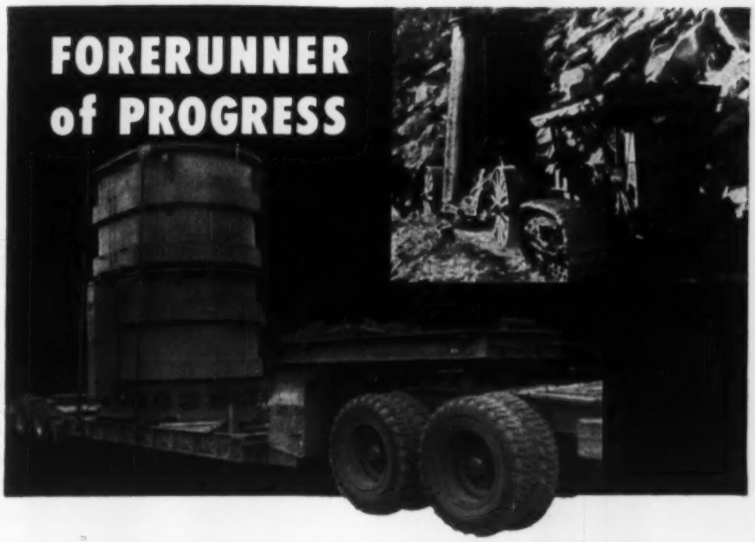
• **T. H. Banfield Expressway**—Twelve miles of the 14-mile route linking U. S.

GOLDEN STATE FREEWAY cuts through southern California hills to speed traffic from the north to the San Fernando Valley area of Los Angeles.

30 to the east at Troutdale with midtown Portland, Ore., was opened October 1. This $17 million, route drops traffic through sweeping grades of a natural watercourse. Final section will be opened in 1957.

- **Eastshore Freeway**—This 55.7-mi. California freeway runs along the east side of San Francisco Bay from Richmond in the north to San Jose in the south. Now completed are 29.3 miles, which involved 22 major contracts and cost $38.6 million. Total right-of-way expenditures have been $19 million. A 3-mi. section under a $4.8 million contract was finished in 1955 along with a $4.8 million revision of the distribution structure at the east end of the Oakland Bay Bridge. A 4.8-mi. segment at the northern end, which includes construction of nine reinforced concrete bridges, will be completed in mid-1956. Construction has started on 10.6 miles, involving 5 contracts and $18.3 million, including sections in Berkeley, Oakland and Hayward. The freeway is scheduled for 1958 completion.

- **Embarcadero Freeway**—This 2-mi. freeway extends along the San Francisco waterfront and ties into the Bayshore Freeway at the San Francisco-Oakland Bay Bridge approach. The first unit, nearly a mile long, was started in 1955 and will be completed in 1957, at a total cost of $5.7 million. Two more units, totalling 1 mile in length and involving a double-deck, elevated concrete viaduct



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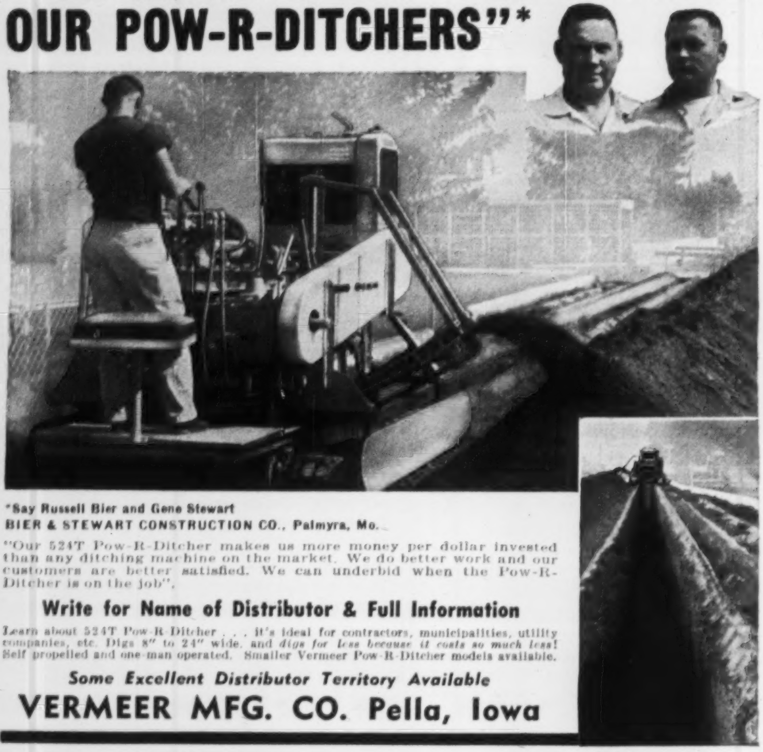

*Say Russell Bier and Gene Stewart
BIER & STEWART CONSTRUCTION CO., Palmyra, Mo.

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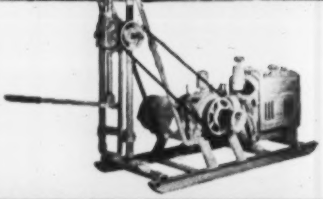
Acker power operated soil sampling rigs combine into a compact, portable unit a standard power plant together with powerful hoisting winch and pump. Two models are available — Acker Model RGT for light duty and Acker RG for heavy duty service. These relatively inexpensive units are ideal for soil sampling, jetting and driving pipes or piles.

More for Your Money!

Add an *Acker rotary drill head* for rock coring and foundation test boring.

The Acker Model SK rotary drill head when combined with Acker RGT and RG rigs make an ideal unit for rock coring and foundation test boring. For complete information, write today for bulletin *28-ENR.*



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by San Francisco's Ferry Building will be started in 1956 at a cost of $7.9 million.

- **Waldo Grade**—Conversion of the 4-mi. portion of U. S. 101 north of the Golden Gate Bridge from a four-lane undivided highway to a divided six-lane freeway is complete. Tunnel construction and grading costing $4.5 million were completed in 1955. Paving and finishing-up work, amounting to $1.5 million, was completed in January.

- **Bayshore Freeway**—By the end of 1955, $36 million has been spent on construction and $23 million on right-of-way for the 23 miles that are open to traffic on the ultimate 49-mile, 6-lane freeway between San Francisco and San Jose, Calif. Open to traffic in 1955 was 6.5 miles in three separate contracts. Biggest traffic bottleneck at present is a 3.6-mile section just south of the San Francisco city limits on which construction will be completed in 1957. Early in 1956 contracts totalling $7.2 million will be bid. These, together with an $0.8 million contract underway, will see the freeway completed an additional 8.3 miles to the San Mateo-Santa Clara County line. And at the San Jose end of the freeway a $1.8 million contract covering 1.6 miles is under way.

- **Richardson Bay Bridge**—Work is 67% completed on this 2864-ft bridge located in California's Marin County 4 mi. north of the Golden Gate. Completion is scheduled for December, 1956, with total cost of $3.2 million. The 6-lane bridge includes 225-ton capacity bearing piles and 80-ft long, T-shaped prestressed concrete girders.

- **Richmond-San Rafael Bridge**—The $68 million bridge across the north arm of San Francisco Bay neared partial completion with upper deck expected to be open for traffic in October, 1956. The $21 million superstructure contract was 92½% complete at the end of 1955, with closing the west 1070-ft cantilever span the main job yet to be done. Work on the lower deck got under way in 1955 and with its completion in October, 1957, will give the bridge three traffic lanes in each direction.

- **Carquinez Bridge**—Four contracts totalling $27 million were awarded late in December to mark start of a new bridge across Carquinez Straits northeast of San Francisco. The bridge paralleling and similar to an existing structure finished in 1927 will have two 1100-ft cantilever spans, two 500 ft side spans and a 150-ft mid-crossing tower. One of the contracts for $7 million is for a 3-mile approach freeway that in-

FORT WAYNE, IND. *made it two*

for better water service throughout the community

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SANTA ANA FREEWAY cuts a path through orange groves between Santa Ana and Tustin, California, is expected to spur housing development in the area.

cludes a single 8,000,000 cu yd highway cut.

• Southern California freeways—In 1955 a total of 11.6 miles of full freeway was completed in the Los Angeles area thus placing 77.6 miles of freeway in operation. To the southwest, 1955 saw completion of a 2.5-mile, $2.7 million southerly extension to the Santa Ana Freeway in Orange County, and four grade separation bridges, worth a total $1.5 million. In the Pasadena area the first 1.8-mile unit of Foothill Freeway was finished at a cost of $2.2 million, and a 0.8-mile, $1.8 million westward extension of the Colorado Freeway helped remove a traffic bottleneck between Eagle Rock and downtown Pasadena. A 3-mile, $3.3 million extension of the Golden State Freeway, at the northern edge of Los Angeles, now ties in with U.S. 99. At year's end, some $31 million in construction jobs were under contract, most of them to be finished in 1956.

A number of vital projects got under way in 1955, including $15 million worth of projects adding 16 miles to San Bernardino Freeway. When opened in 1956, they will complete the uninterrupted 30-mile stretch from Los Angeles into San Bernardino County. First 4-mile unit of a new freeway, the Ojai, heading northward from Ventura, was begun at a cost of $11 million. Some $16 million worth of work, most of it started in 1955, will take the Harbor Freeway 5.6 miles farther toward the Harbor area in San Pedro, and add 2.8 miles at the Harbor end. A 2.7-mile link on the Santa Ana Freeway was begun, and a $5.5 million, 2.4-mile section from Los Angeles' Griffith Park toward Burbank on the Golden State Freeway was started.

• Hilo, T. H.—About 31.5 miles of the 40-mile Hamakua Coast Highway was complete as 1955 ended, with another 1.25 miles under construction and 3.03 miles programmed for 1956. The $17.5 million highway program calls for a 24-ft wide concrete highway down a steep, gulch-pocked coastline that requires 40 major and several minor bridges.

• Honolulu, T. H.—Two miles of Honolulu's second post-war arterial highway are complete at a total cost of $7.3 million. A highway overpass costing $2.3 million, including rights of way, is under construction. Programmed for 1956 is another 1.4-mile segment costing $3.8 million. Total cost of the highway is estimated at $40 million for a 7-mile route.

• Honolulu, T. H., tunnel—Litigation over design and financial responsibility kept Honolulu's Wilson Traffic Tunnel virtually stalled through all of 1955. Work shut down after an Aug. 14, 1954, cave-in killed five men. The 2,773-ft tunnel had progressed to the 2,000-ft mark at the time of the cave-in. Drifts have been

(Continued on page 171)

WANTED — More Cement ...More Aggregates

LOCAL MOVING
LIVESTOCK

Accelerated highway expansion, along with other construction programs, means greatly increased activities in the cement and aggregate industries. Volume and specification demands present a challenge that can be met with improved equipment, modern methods and efficient plant operation.

The following pages will show you how Allis-Chalmers equipment and engineering assistance make these programs profitable.

A-4644

ALLIS-CHALMERS

Milwaukee 1, Wisconsin

How ALLIS-CHALMERS Helps

ENGINEERING HELP for plant operators and consultants

Ahead of you lie what could be your most profitable years. Is your plant ready to handle the volume? Is your plant geared to meet rigid specifications, economically? The best way of finding out is to get in touch with Allis-Chalmers for an expert evaluation of your present processing operations.

Why Allis-Chalmers? — No other company builds as many types and sizes of integrated processing machinery, power generation and utilization equipment. In examining your problems, Allis-Chalmers is not only concerned with correct application of machinery but with overall plant efficiency . . . ways and means of making existing as well as new equipment "team up" to produce maximum volumes of desired products at lowest cost.

Valuable Assistance for You or Your Consultant — Flow and plant design, pre-recommendation research and pilot plant testing, expert installation and service are all available from Allis-Chalmers, a company with over a century of experience in designing, building and applying processing machinery.

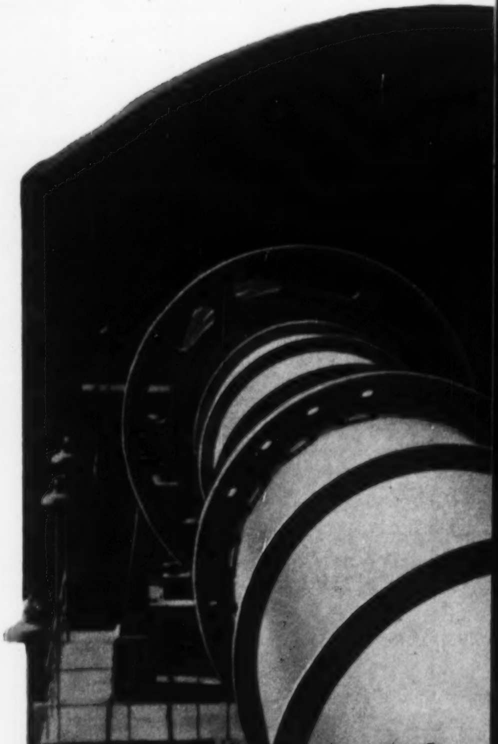
Unbiased Recommendations — Whether you operate a small pit or a complicated production system, the facilities and experience of Allis-Chalmers are at your disposal. And Allis-Chalmers broad scope of integrated equipment permits making unbiased recommendations, dictated entirely by your specific needs.

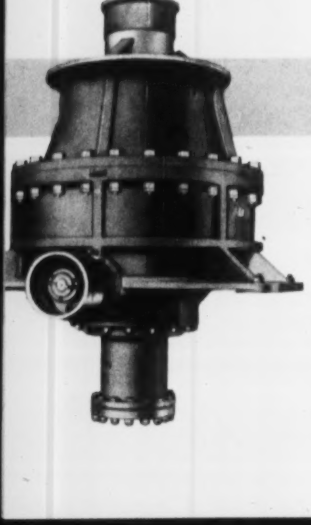
Service Everywhere . . . At All Times — Allis-Chalmers interest in your problems does not end with the installation of equipment. Laboratory facilities, periodic check-up, maintenance and fast emergency parts service are yours continuously through your nearby Allis-Chalmers representative.

Allis-Chalmers Rotary Kilns for Cement and Lightweight Aggregate Production

Cement operators have long acknowledged the superiority of Allis-Chalmers rotary kilns—superiority that is reflected in long-term dependability as well as low-cost operation and maintenance.

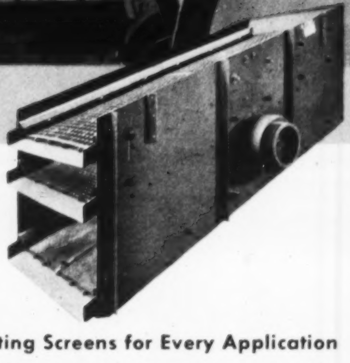
Efficient kiln design is a result of Allis-





Hydraulically Adjusted Crushers Afford One-Man, One-Minute Product Control

Most Allis-Chalmers gyratory crushers are supplied with hydraulic adjustment which provides precise product size control by the flick of a finger. Compensation for wear and emergency unloading are controlled in the same manner. Other Allis-Chalmers crushers include a broad range of jaw crushers, roll crushers, and multi-impact hammermills.



Vibrating Screens for Every Application

Allis-Chalmers builds a complete line of vibrating screens, including units for scalping, medium and fine separation, wet or dry screening, rinsing and dewatering.

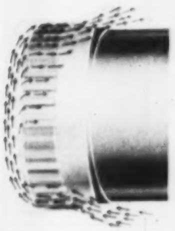
Cement and Aggregate Plants

★ ***Increase Volume***

★ ***Meet Specifications***

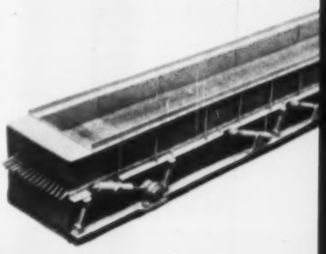
Chalmers specialized engineering and the experience gained in building and applying hundreds of kilns in the last 50 years.

Allis-Chalmers all-welded rotary kilns are built in standard and special sizes for a wide variety of uses, including cement manufacturing and the production of lightweight aggregates, lime, refractory materials, fertilizers and chemicals.



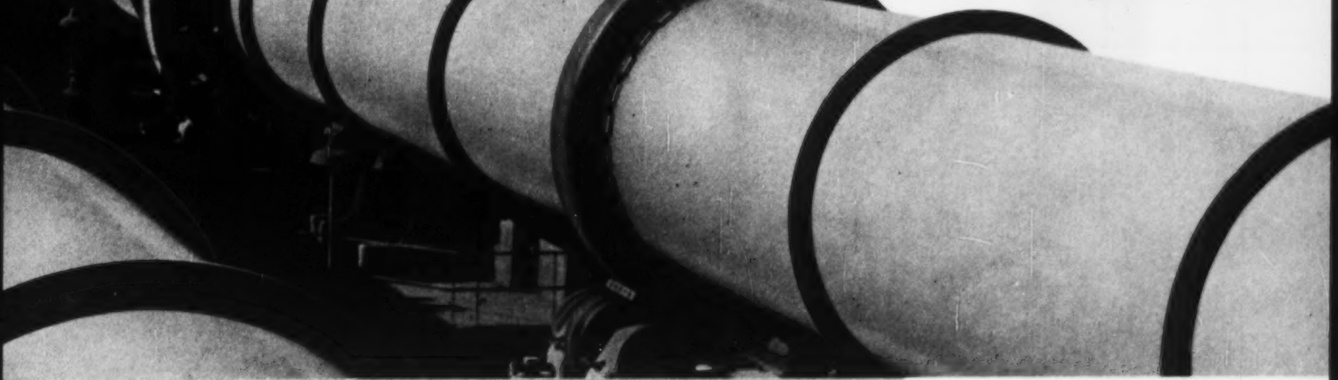
Air-Cooled Kiln End Keeps Nose Brick in Place

There's no end warpage on kilns equipped with this air-cooled end. Cooling air circulating around discharge end along underside of nose casting keeps kiln end cool, prevents distortion. Production loss is greatly minimized and unit pays for itself in two or three years in refractory savings alone. Saves fuel, too, by maintaining positive air seal between firing hood and kiln. Can be installed on any make of kiln.



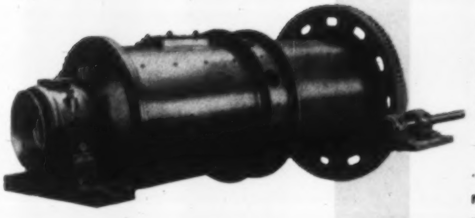
Air-Quenching Cooler for Better Products at Lower Cost

Improves grindability of cement clinker by fast quenching. Saves cement kiln fuel by isolating and directing hottest air back to kiln. Lowers power costs. Simplified design minimizes maintenance.



Grinding Mills for Profitable Production of Specification Sand

Because of stringent specifications, decreasing natural sand reserves and local variations in sand and gravel, operators are "manufacturing" sand in Allis-Chalmers rod mills. These mills are simple to operate. Maintenance is low. Allis-Chalmers also manufactures many other types of mills used wherever finely ground materials are produced, including multi-compartment mills for grinding cement raw materials and clinker.

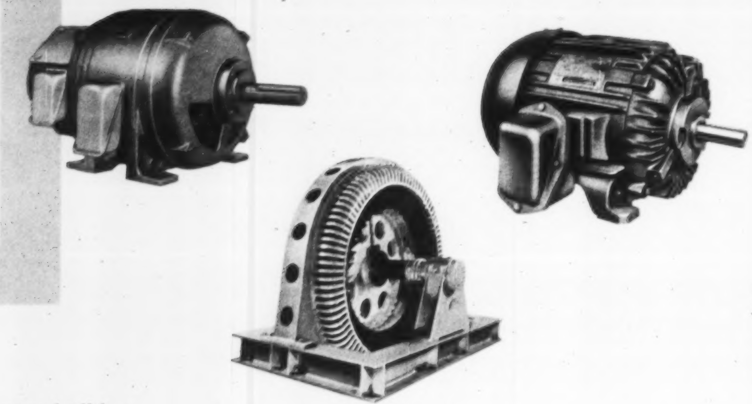


***In addition to processing machinery, Allis-Chalmers supplies the required**

ELECTRICAL EQUIPMENT

. . . machinery and equipment designed to work together, backed by undivided responsibility.

ALLIED ELECTRICAL EQUIPMENT



MOTORS

— Allis-Chalmers builds a complete line of polyphase squirrel-cage and wound-rotor induction motors for every industrial use. These, as well as synchronous and direct current motors, are available with electrical and mechanical modifications to meet a wide variety of applications. Mechanical modifications obtainable include drip-proof, splash-proof and totally-enclosed fan-cooled construction in vertical as well as horizontal types. Many ratings are available with flange-type construction.

Squirrel-Cage Motors — Most used of all motors is constant speed three-phase cage motor. Construction simplicity makes initial cost and maintenance low.

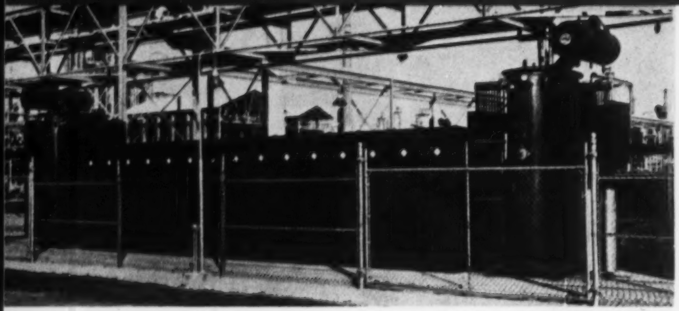
Wound-Rotor Motors — Used for constant speed duty requiring frequent reversing or starting under heavy load; high starting torque. Also suitable for adjustable-varying speed duty.

Synchronous Motors — Applicable to most constant speed drives. Operating characteristics include high efficiency and the ability to improve system power factor. Widely used for grinding mills, either through magnetic clutches or as direct-connected high torque motors.

Direct Current Motors — Occasionally used for adjustable-speed service, such as for kiln drives.

ALLIS-CHALMERS

A-C
ALLIS-CHALMERS



UNIT SUBSTATIONS

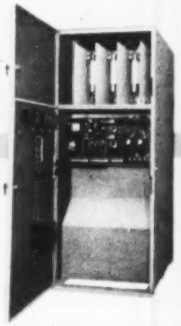
Switchgear is the key to power continuity. In the substation illustrated, double-ended switchgear is combined with duplicate Allis-Chalmers power transformers.

Allis-Chalmers switchgear offers the following advantages:

Saves Space — Compartments have been designed to permit adding special transfer bus or ring bus without adding cubicles.

Saves Cost — Elimination of duplicate facilities or extra cubicles cuts equipment cost.

Saves Time — Dry-type bus joint insulation simplifies adding or removing cubicles. There are no compounds to melt.



CONTROL

Allis-Chalmers can supply motor control for practically every application. Shown is the Type H Control for 2300-5000-volt motors. Starter is provided with air or oil contactor. Meters, relays, fuses, switches — everything needed for the complete protection of man, motor and machine is conveniently installed in an attractive, easy-to-install cubicle.

I would like bulletins on

(Type of equipment)

ALLIS-CHALMERS
Milwaukee 1, Wisconsin

Explanation of process or problem.

Name

Title Company

Address

City Zone State

A-4644

pushed into the debris poured into the tunnel by the disaster, but boring has not gone past the point of the disaster. The tunnel is intended to open a new traffic route through the Koolau Mountains connecting Honolulu and its growing Windward Oahu suburbs.

- **Honolulu freight terminal** – Honolulu's new $5.2 million overseas terminal at Pier 2 was completed and dedicated in 1955 and now handles a large portion of the harbor's freight traffic. Covered storage area of 353,700 sq ft (8.2 acres) is believed to be the largest shedded area on any waterfront terminal in the U. S. The pier front is 1,717 ft long, sufficient to handle three C-3 freighters at once. Studies are under way for a new passenger terminal nearby.

- **Port of Long Beach**–Largest project completed in 1955 by the Port of Long Beach was the $2.5 million, 6-berth Pier C development at Long Beach Harbor, finished in August. Two transit sheds totalling around $3 million were begun and should be ready for use in the first half of 1956. A smaller shed was started and completed in 1955. Two $6.5 million bridge superstructures, scheduled to get under way in 1955, were held up by the squabble between the City of Long Beach and the State of California over allotment of funds from tidelands oil. A five-year projected program, including some $25 million in new construction and improvements, may also feel the effect of the dispute, not expected to be settled earlier than 1957.

- **Pacific Northwest pipeline**–Work was begun during 1955 on a 1,487-mi. pipeline to carry natural gas from the San Juan Basin of New Mexico to the Pacific Northwest at an estimated cost of $176 million. Being built for the Pacific Northwest Pipeline Corp., the job is scheduled for completion into Washington during 1956. Distributing companies began the expansion of their systems, expect to spend some $60 million in the next five years.

- **Alaskan Way Viaduct**–Work was started late in the year on the first 1,000-ft extension southward of the Alaskan Way Viaduct in Seattle, at a cost of $727,000. Contracts totalling some $2 million are scheduled for award in 1956 on this $4.5 million project.

- **Duwamish River Bridge**–In Seattle, unique floating piers were installed for a $7 million bridge across the Duwamish River at First Ave. S., and considerable work was done on the approaches. A double-bascule steel span is scheduled for installation during the year, with completion scheduled by next fall.

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VIRGINIA KEY TREATMENT PLANT, Miami, Fla., will provide primary treatment and ocean outfall disposal for 47 mgd.

Even New Highs Fall Short of What's

Inadequate progress marked 1955 in the general field of water supply and sanitation.

In water pollution control especially there were perhaps about the usual number of new ideas and improved techniques that characterize this lively field, but the over-all trend, the net effect on clean-up of polluted waters, showed a loss against the preceding year if measured in dollars committed to the problem's solution.

Even in water supply, where a burst of activity pushed contracts awarded to a new all-time annual high, it was difficult to say that construction was keeping up with demand.

Using the figures for what progress there was:

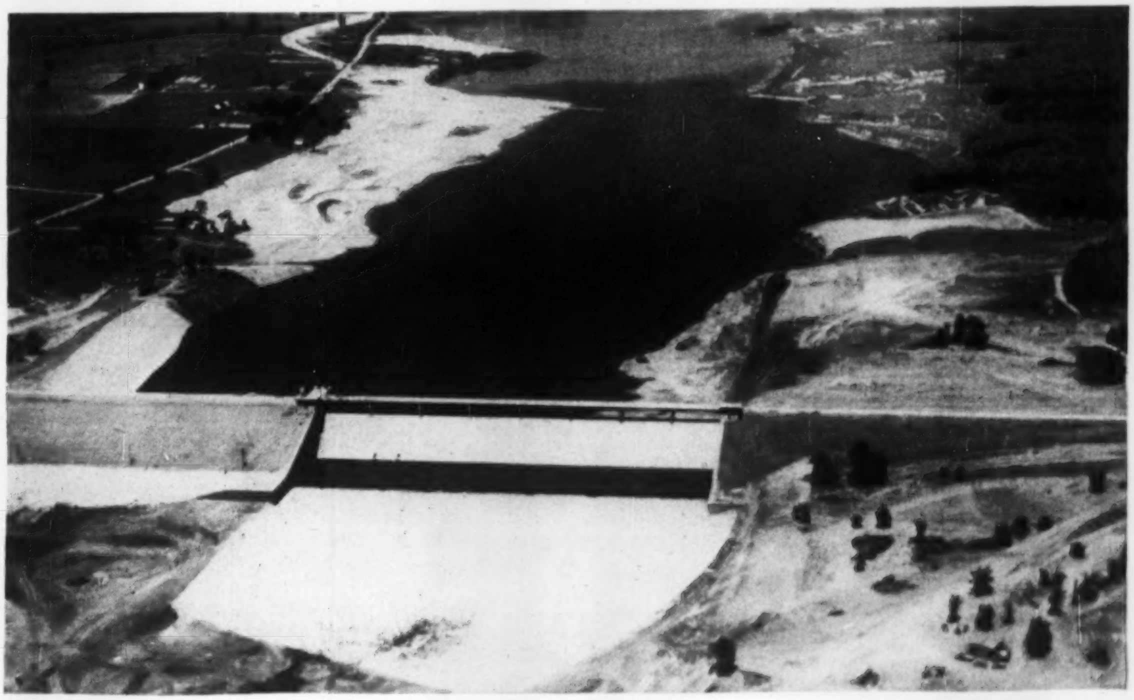
Sewerage contracts let in 1955 totaled $402 million, a small recovery from the $388 million in 1954, but less than the record of $431 million committed to this problem in 1953. Something like $500 million per year is still considered the minimum expenditure necessary each year to keep up with needs.

Waterworks contracts in 1955 surged to over $314 million—28% above the 1954 level of spending. But of the $68 million increase, New York City could be said to have accounted for almost $40 million of it on its third-stage Delaware tunnel, awarded late in the year. It is also to be noted that contract awards for waterworks projects are coming out of the backlog at only about half the rate proposed works enter it. With population (housing) and industry (industrial building) booming, water supply projects are hardly keeping pace.

• Silver lining—The agonizing rate of progress in this field of sanitary engineering has its bright spots, of course. For the field hardly lacks for talented leadership—in the technical nor in the administrative posts of importance. Leadership, for example, rose to the occasion last year as federal legislation was proposed to extend the expiring Water Pollution Control Act of 1948. The Administration bill (S. 890), as written by the Public Health Service, would have strengthened the hand of the federal government in taking last-resort action against pollutors of interstate streams. Thrashed out in hearings, the bill finally passed the Senate suitably amended to leave the initiative with the states for asking federal intervention. The Administration now goes along with this, and enactment of a permanent clean streams law early in the current congressional session is most likely.

Waterworks men in turn led their sewerage brethren to Washington last year in a second example of what aroused leadership in this field can do. This time the legislation at issue was the federal-aid-to-highways proposition. In this instance, superintendents and operators (and designers, builders and suppliers) of water and sewage utilities joined with representations from others affected to demand that any federal aid to highways be made to pay the cost of utility relocations caused by road building.

In this effort to influence legislation, there was no final effect, for highway legislation got nowhere in 1955's session of Congress. Now, however, with the 1956 session started, the effort is resumed. It has been suggested that the needed federal highway legislation dodge the issue entirely by granting



HOOVER DAM, Columbus, Ohio, will provide domestic and industrial water for a period of more than 15 years.

Needed

federal funds without strings, leaving with the individual states the decision of how to pay relocation costs. Another suggestion is to grapple with the issue now, with a view to finding a solution somewhere between the extremes of utilities-pay-all and utilities-pay-none of the relocation costs due to highway improvements.

• **Tax-break can help**—Enlightened administrative leadership was not limited in 1955 to matters of federal legislation affecting waterworks and sewage work progress. At the state level, two legislatures gave tax aid to industries building industrial waste treatment plants; New Hampshire and North Carolina joined the state of Wisconsin in this commendable practice. New Hampshire exempts such facilities from local taxes for 25 years; North Carolina allows a 5-year write-off for state income tax purposes, and exempts industrial waste works from property taxation forever; Wisconsin's pioneer law of 1953 gives a 5-year local tax holiday.

Other than in legislation—in regulation—the Ohio River Valley Water Sanitation Commission in 1955 promulgated its policy on industrial wastes. Many years of effort had been put into industry-task-force work by the eight-state commission; its adopted policy came not without labor pains. Called an entirely new, practical approach, the policy recognizes that river use varies from point to point; it is to be based on conditions and characteristics of streams at each individual point of industrial wastes discharge. The commission optimistically expects now to make the same kind of progress against industrial pollutors that it has recorded in the municipal sewage field (46% of 9,600,000 people in the Ohio Valley now have sewage treatment facilities, and another 12% will be served by plants under construction).

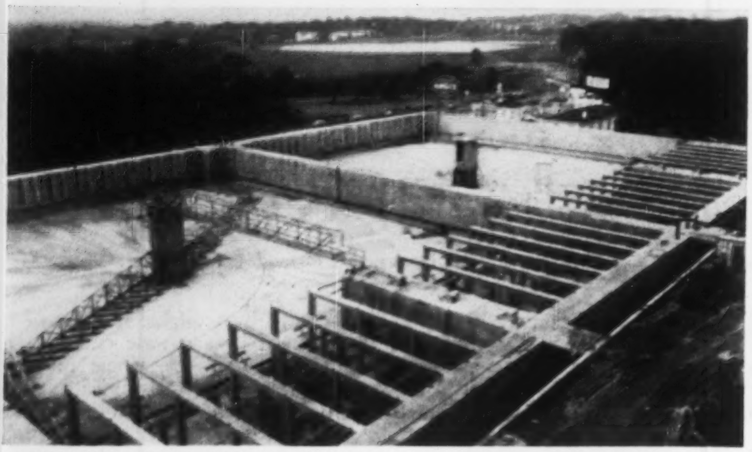
• **Basin-wide attack**—A significant "intra"-state water conservation project came into the news in 1955, a project that made history 38 years before as the leading (5-dam) flood control project in the nation. Today, Ohio's Miami Conservancy District is reappraising its river basin for its value as an industrial water source and for its capability to assimilate sewage and industrial wastes. Probable outcome of the re-evaluation will be an additional 200,000 acre-ft of storage, increased low-flows, and groundwater recharge along the stream.

A similarly creditable solution of a water need by area-wide effort is in Fairfax County, Va., where integration of seven public and private sewer districts had already paid off. Studies show the regional attack will work for water as well.

Other evidence that cooperative effort and combination of forces help to get more water supplied or sewage treated per dollar was presented in 1955 to Chicago in a consultant's report recommending a $300 million expansion over 25 years. Chicago then would be able to supply water to an entire metropolitan area of suburbs now struggling in vain to quench an ever-growing thirst.

Still other evidences of far-sightedness on the part of water project planners are to be found in Texas, where the Canadian River project is now financed as an authority arrangement to supply several Panhandle cities; in Denver, where a $75 million bond issue was passed to tunnel western slope water through the Rockies in a power-for-water exchange with the Bureau of Reclamation; in Dallas, where a first reservoir 40 miles to the east on the Sabine was contracted for as first of a series of 13 the Sabine River Authority includes in a long-range master plan; in New York, where stage 2 of the Delaware River development was finished and stage 3 began to take

DALECARLIA PUMPING STATION, Washington, D. C., will house 15 vertical pumps delivering 477 mgd in a structure that will extend to more than 40 ft below grade.



ASHBURTON FILTRATION PLANT (120 mgd), is set for April operation at Baltimore where the $12-million project is approximately 60% completed.

advantage of the new Supreme Court-imposed limit of 800-mgd the city may divert from the interstate Delaware Basin; in California, with the Feather River scheme; in Charleston, S. C., where a grandoise industrial water development was started—an so on.

• **Stalemate**—Hardly so far-sighted, the state of New Jersey is still struggling with a politics-ridden water supply situation. This past fall, the question was whether to finance a specific $102 million Chimney Rock water project to supply an eventual 200 mgd to northern New Jersey communities. The issue failed of passage. It had been clouded with competition from the earlier proposal of a Round Valley reservoir.

New Jersey, therefore, enters another year not one iota closer to having the water it needs than in the days of 1949-50 when crippling water shortage widely affected a population that has since grown appreciably. Northern New Jersey remains one of the nation's critical water-shortage areas.

One ray of hope that other than a tack-hammer solution to the problem might be chosen is to be found in current N. J.-Pa. discussions of the dam proposed for Wallpack Bend on the Delaware. Legislation passed in both states would permit 30% New Jersey participation in a dam Pennsylvania would build. New Jersey now would like to contribute 50% and get half the water that would be stored.

• **L. A. in a jam**—Just how badly sewage work construction can fall behind, and an indication of its importance, is to be found in the action of Los Angeles last year forbidding new construction of any kind that would further tax inadequate sewerage. Later, there followed passage of a $60 million bond issue to finance the needed sewerage works extension; $41 million worth went under design forthwith. The design to evolve is awaited with much interest. It will be based upon a vital decision on the part of Los Angeles to revamy its famed Hyperion treatment works. One of the nation's biggest complete treatment works, Hyperion will be modified to give primary treatment; effluent and sludge both will be piped out to sea.

Another interesting design not yet fully revealed has developed out of an industrial waste pilot plant of American Cyanamid at Bound Brook, N. J. As a result of its studies, Cyanamid has offered to build a complete treatment works at which it would handle not only its complex assortment of chemical wastes, but also the settled sewage of all of Sommerset County. The county authority could then build only a primary plant and pay Cyanamid for the secondary treatment of its sewage. No deal has yet been announced; unquestionably it will take some study before the two parties might agree on who pays what to whom in this unusual arrangement.

Farther down the Raritan River, the Middlesex County Sanitary Authority began work on its now-designed trunk-sewer and treatment project.

• **Mine wastes may succumb**—The last remaining "untreatable" industrial waste gave way a little to progress in 1955 as first light was shed on findings in the laboratory at John Hopkins University. Inventor Walter A. Patrick—his patent finally secured—described for the first time his theories on treating abandoned coal mines to inhibit formation of acids that issue from them to pollute streams. It is an exciting prospect, but much field work remains to be done to substantiate the feasibility of his findings.

If 1955, on the whole, was somewhat disappointing in the progress made in developing and conserving through pollution control the nation's water resources, there is hope that 1956 will be better. It has already begun with a bang with award of $85 million worth of work on Pittsburgh's long-planned sewage tunnels and revolutionary treatment works (the Laboon process). Boston's Deer Island treatment plant is another big one, along with the work on Hyperion.

Waterworks construction, too, can't reasonably go anywhere but up, considering the pressures of population and industrial growth upon it.

There is no hope for an explosive impetus in this field such as highway and school construction needed and should get from proposed federal aid. But the need exists here too. And perhaps 1955 will eventually be recorded as an unimpressive year of make-ready for a real push in 1956. It is needed.

(*Major Projects start on page 176*)

The feet* here are piers used to support Harry Street Bridge, Wichita Kansas. Inland Construction Co., Contr.

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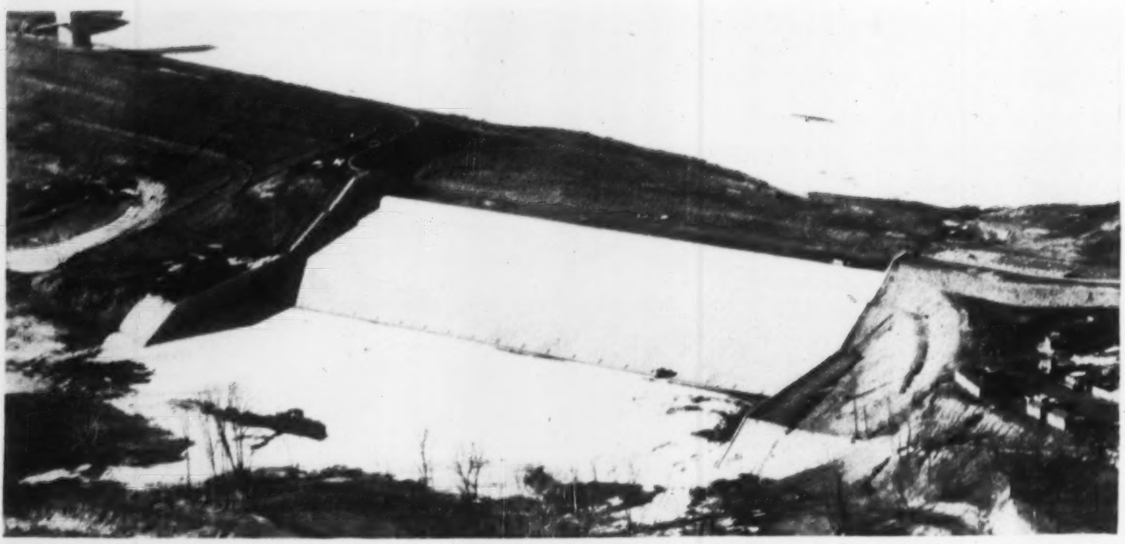


MORSE DAM, Indianapolis, will impound 7 billion gallons when completely full. The project was completed late in 1955.

Major Water Supply and Sanitation Projects

• **Amarillo, Tex (Water)**—Contracts totaling $2.1 million were awarded last year for increasing Amarillo's water supply. Biggest single contract was $1.5 million for the construction of 18 miles of 45-in. supply line. Included in the over-all program, to be completed by July 15 of this year, are: Ten 750-ft deep wells; three storage tanks of 5-mg, 1-mg, and 0.5-mg capacities; and one pumping station with switchgear and pumping units. Additional contract work this year will include another pump station, two pumps and switchgear, and nine water well pumps.

• **Baltimore (Water)**—The $12-million, 120-mgd **Ashburton Filtration Plant,** 60% finished at the end of 1954, is nearing completion. The plant is expected to be in operation in April, 1956.

The **Montebello Master Chlorinator Station,** total cost $354,784, was put into service in August of last year.

To increase water flow to the Catonsville area, a 48-in.-dia transmission main from Ashburton pumping station was installed in the Gwynns Falls Parkway, and a new 48-in. supply main to **Guilford Reservoir** was added to strengthen the supply to Towson.

• **Boston (Sewerage)**—Under contract at present in the Boston Metropolitan District Commission's $65-million sewerage program are seven major projects.

The **North Metropolitan Relief Tunnel,** four-miles of deep rock tunnel from Chelsea to Deer Island, site of the **Deer Island Treatment Plant** which will be started this year. Concreting of the tunnel was substantially completed in 1955, grouting is now in progress and work remaining consists principally of shaft lining. Contract is 90% complete.

The **Boston Main Drainage Tunnel,** seven miles of deep rock tunnel from Roxbury to Deer Island (4½ mi of 11½-ft-I. D. and 2½ mi of 10-ft-I. D.) is about 26% complete. Tunnel driving continued during 1955, with completion of heading from Deer Island to South Boston, and driving is now in progress from Shaft B in South Boston, which was completed during the year. Shaft A, in Roxbury was started with the sinking of an open caisson 140 ft deep. The shaft is almost completed.

Now under contract, are 25,000 ft of the 45,000-ft **South Charles Relief Sewer,** which varies in size from 36 to 72 in. of precast pipe and cast-in-place sections 7x9 ft and 8x10 ft. Present construction is in three contracts that vary in completion from 90% finished on one, to setting up plant on another. Two additional sections will be advertised for bids early this summer. Bids recently were asked on one 8,000-ft-long, 9-ft-dia section that will be constructed as a soft-ground air tunnel.

Plans and specifications are nearing completion for the entire North Charles Relief Sewer, which will consist of 17,000 ft of sewer varying in size from 30-in-dia to 60-in-dia pipe and two cast-in-place sections. Bids are scheduled for advertisement during this summer.

• **Boston (Water)**—All but a half-mile of a 7-mi-long, 10-ft-finished-dia tunnel has been driven in deep rock, and a concrete plant has been installed for placement of the tunnel lining. The **City Tunnel Extension,** as the project is called, is about 43% completed.

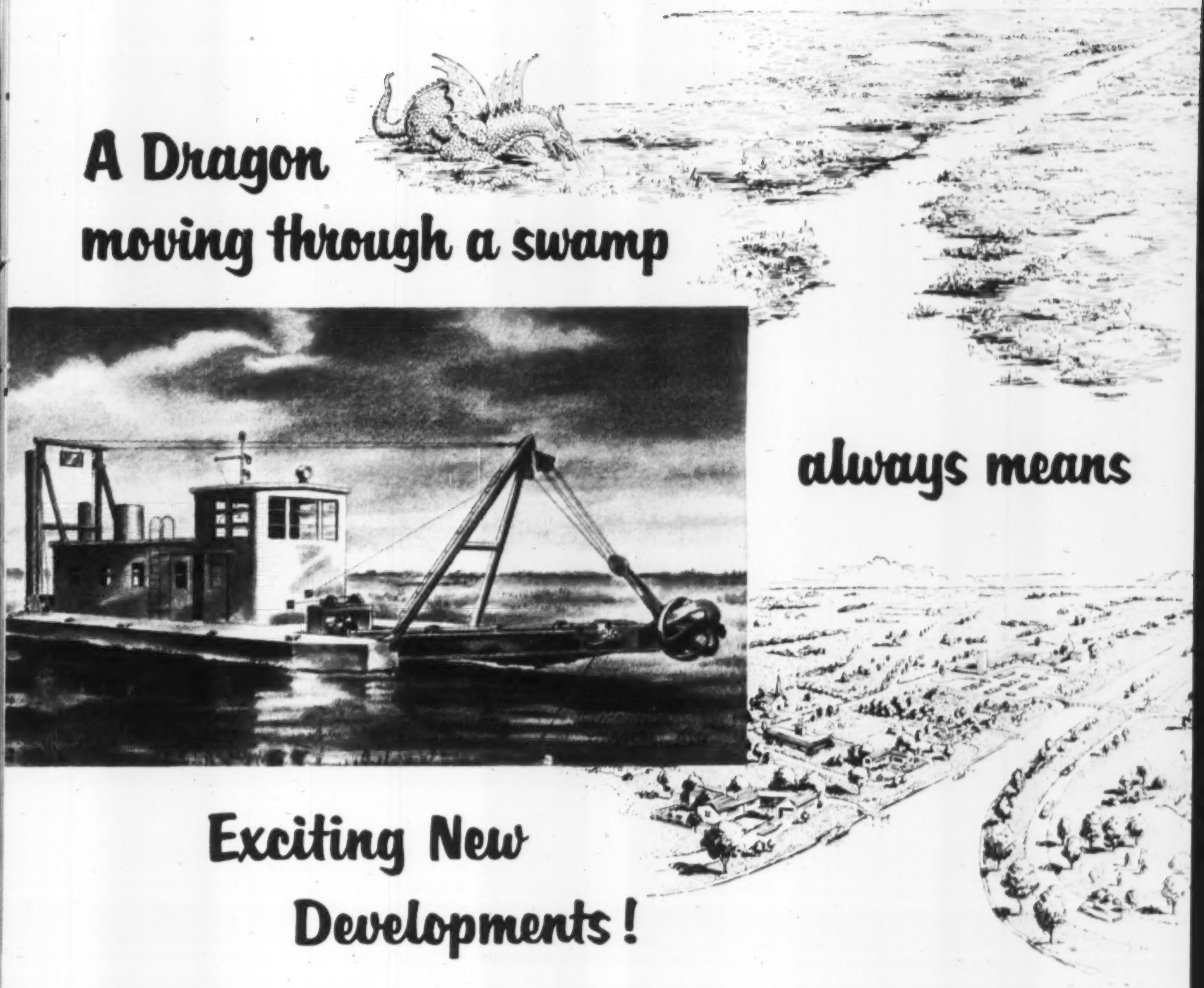
Work will be started on connections from the City Tunnel Extension to the distribution system mains. Plans and specifications for about five miles of 48-in. pipeline connectors are being prepared, and work will be advertised early in the spring.

• **Chicago (Sewerage)**—About $12 million worth of contracts will be awarded this year by the Chicago Sanitary District for interceptor sewers, and plant additions and equipment. Five major sewer contracts, the largest $2.2 million, will total about $7.0 million. Contracts for about $2.6 million worth of equipment will be awarded for the **West-Southwest Treatment Works,** and about $2 million for additional plant at the **Calumet Treatment Works.** Last year the Sanitary District awarded about $9.5 million worth of sewerage works construction, and completed about $5.3 million.

• **Chicago (Water)**—After a taxpayers' suit held up construction of the Central District Filtration Plant out in Lake Michigan for one full construction season, 1955 saw resumption of operations on a $6.6-million sand, clay and rockfill cofferdam that encloses the site. By the end of the year, the 61-acre cofferdammed area had been fully enclosed. When the plant is completed, it will treat 960 mgd and serve a population of 3 million Chicagoans, making the project the largest of its kind to be built. Estimated cost of the Central District project has been set at $85 million. Six miles of large-diameter tunnels will connect the treatment plant with the city's distribution system as soon as the plant is completed. The entire project was designed by the Bureau of Engineering at Chicago's Department of Public Works.

• **Cincinnati Sewerage**—Two major con-

(Continued on page 180)



Ellicott Dragon* Dredges quickly and economically reclaim barren ground. Residential developments, industrial sites, busy airports, whole shopping centers replace marshy wastes! Soggy swampland becomes *valuable real estate.* No "one-job" investment, your Dragon tackles one site after another . . . removing wet material, depositing approved fill to support any building project.

Easily knocked down and reassembled, the compact Dragon moves *anywhere* by trailer, flat car or ship. And Ellicott Dragons speedily write off their initial cost! Compared to other methods, Dragon cost is very low—the cheapest known method of moving water-bound solids. For full information, write for free Bulletin No. 826. Ellicott engineers will gladly make specific recommendations on any digging or filling problem, without obligation. ELLICOTT MACHINE CORP., 1603 Bush St., Baltimore 30, Maryland.

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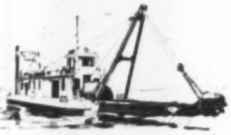
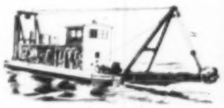
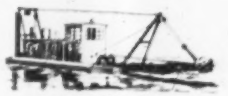


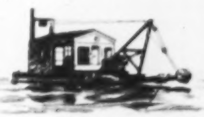
Ellicott "Dragon" 20—"GIANT" DRAGON, assembled in a few weeks; can pump 400-1250 cu. yds. per hr. through pipelines up to 6000 ft. Diesel-electric power.



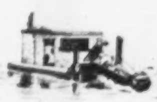
Ellicott "Dragon" 16—Dredges 350-850 cu. yds. per hr. and pumps through pipelines up to 5000 feet long. All "Dragons" are available with enclosed or tropical deck house.



Ellicott "Dragon" 12—Dredges 100-400 cu. yds. per hr. of mud, silt, sand and clay, and pumps through pipelines up to 4000 ft. long. Works in minimum channel width of 50 feet.



Ellicott "Dragon" 8 and "Dragon" 10—Easily assembled in 4 days; pump mud, silt, sand and gravel through pipelines up to 2500 ft. long; capacities from 50 to 300 cu. yds. per hr.



Ellicott "Dragon" Model Canal Dredges—6 to 12 in. sizes, built for irrigation and drainage canal maintenance, will work in 13 ft. width, assembled in ½ day.

600 MILES of new CLAY PIPE

Hot-poured bituminous jointing—one of many effective Clay Pipe techniques—insures low infiltration and remains root-proof. Metal spring clamps lock the snakes in place quickly and easily.

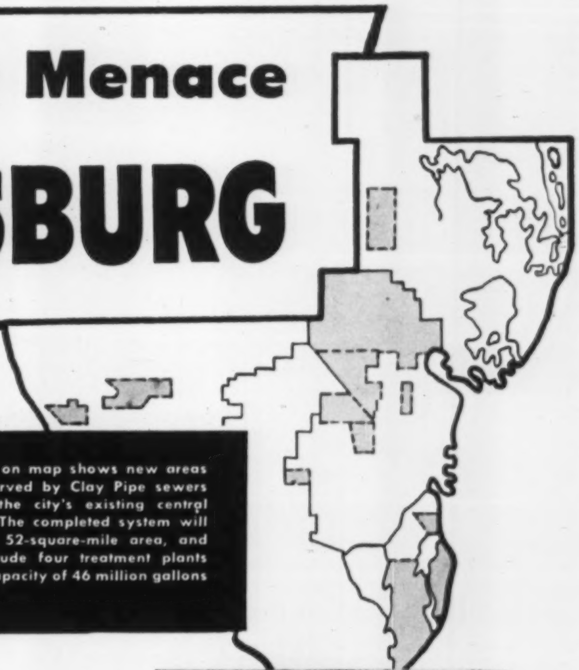
ST. PETERSBURG, FLA. is installing 600 miles of Vitrified Clay Pipe sewers in the city's multi-million dollar sewerage expansion program. The new sewerage network is an important advance in public health protection, eliminating threats of epidemic from individual disposal systems that overflow in the rainy season. The choice of Clay Pipe indicates wise planning for the future. Clay Pipe is guaranteed for 50 years . . . valuable insurance for any bond-financed project. And the experience of many other cities proves that Clay Pipe *never* wears out. For permanent sewers, to protect public health in growing areas that are becoming too crowded for individual sanitary facilities, it pays to specify the best . . . Vitrified Clay Pipe.

Clay Pipe sewers are a welcome improvement to residents who have experienced sewerage troubles in crowded areas. City officials expect the year-round population to increase from 135,000 today, to 500,000 within the next 5 to 10 years, plus millions of Winter visitors every year.

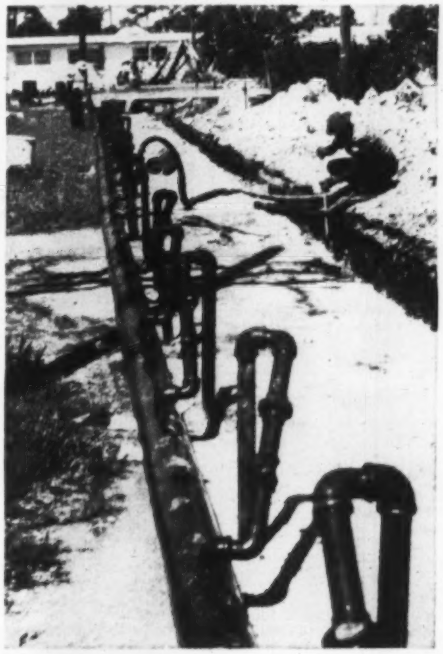
Progress in Public Health

Eliminates Health Menace

in ST. PETERSBURG



Shading on map shows new areas to be served by Clay Pipe sewers around the city's existing central system. The completed system will serve a 52-square-mile area, and will include four treatment plants with a capacity of 46 million gallons a day.



Well-pointing system speeds the work in many sections where the water table is high. Modern Clay Pipe joints in the completed line keep infiltration to a minimum.

Handy lengths of Clay Pipe permit fast, easy installation to keep pace with the trenching equipment. A properly jointed Clay Pipe line is permanently root-proof against the lush semi-tropical vegetation.

CITY OFFICIALS: Samuel G. Johnson, *Mayor;* Ross E. Windom, *City Manager;* Paul Jorgensen, *City Engineer*
CONSULTING ENGINEERS: Smith & Gillespie
CONTRACTORS: J. E. Milam Construction Co., A. C. Sanford, Powell Brothers, Inc., Inter-County Construction Co., Mariani-O'Brien, Inc.

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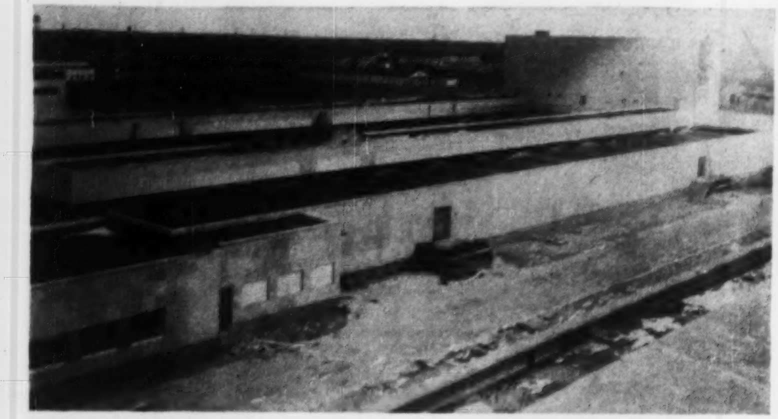
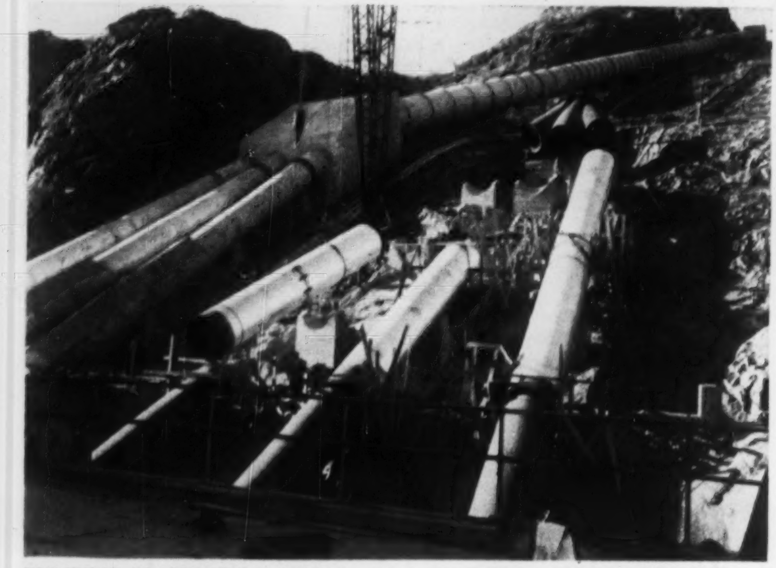
-Through Clay Pipe Research



NORTHEAST WATER PLANT, Detroit, designed with thin-shell arch roof segments.



PUMPING PLANT EXPANSION for Metropolitan Water District of California will add capacities to five existing three-pump plants. Ultimate aim is for 1,200 cfs.

tracts totaling $2.9 million were awarded last year for service buildings and incinerator facilities at the **Mill Creek Sewage Works.** And a $500,000 contract was awarded for construction of the **Boldface Sewage Pumping Station.** Contracts for about $2.5 million of outfall, diversion and interceptor sewers, started in 1954, were finished last year. This year the Department of Public Works plans on awarding contracts for 21,000 ft of 36-in. to 96-in. sewer construction in tunnel, for three sections of the **East Branch Ohio River Interceptor.** The total cost will be about $3.5 million.

- **Cleveland (Sewerage)**—About $2.2 million of capital improvement contracts will be awarded this year, which will advance the city's sewage disposal improvement program nearly to completion. A $5.4 million contract for aeration and final settling tanks, begun in 1953, was completed early last year.

- **Columbus, Ohio (Sewerage)**—The **Scioto River Sewage Disposal Plant** is nearing the final phase of a $10 million expansion and improvement program designed to increase it from the original 50-mgd to 120 mgd capacity by 1957.

The facility cost $4 million originally; $2 million was spent subsequently to modernize operations and increase capacity to 60 mgd; and current installations will cost $2 million and increase capacity to 80 mgd.

Future additions, already authorized, will cost another $5 to $6 million and add 40 mgd to treatment capacity. Bids taken in late January, 1956 on a new sludge incenerator, will be followed by contracts for additional pre-aeration and primary aeration tanks.

- **Columbus, Ohio (Water)**—Taking top honors in Columbus' post-war projects is the $24-million **Hoover Dam** project that includes the dam, 12 mi northeast of the city, a network of distribution mains and a water treatment plant.

Under the present program, Hoover dam will store 19.7 billion gallons of water for the city, but with gates added storage can exceed 27 billion gallons. Even so, this will be adequate only until 1980, and advance studies have been made of other sources.

In addition to completion of the dam project, 1955 saw construction of two 5-mg "storage wells" that will be used as treated water reservoirs. A new **Scioto River Intake Structure** was constructed to serve the **Scioto Treatment Plant,** and three new pumps were installed at the plant. Total improvements to the plant cost $1,505,990.

- **Denver (Water)**—Last year was a memorable one for the Denver Water Department. It saw the completion of **Gross Dam,** a 340-ft high gravity arch dam with a capacity of 42,000 acre-ft on South Boulder Creek, to regulate and store water from the city's Moffat Tunnel supply. The 27-mg **Capital Hill Reservoir No. 3** will be completed this spring at a cost of $688,000, while the 56-mgd, $1.4 million addition to the **Moffat Filtration Plant** will be completed late this year. The total cost of capital improvements to the Denver water system last year was $5 million. Contracts to be awarded this year under the $75 million bond issue approved by the voters last August have not yet been determined. They probably will include, however, the 23-mile **Harold D. Roberts Tunnel** to supply Denver with water from the Blue River on the Western Slope of the Rocky Mountains.

- **Detroit (Sewerage)**—Biggest sewer project under way in Detroit is an $8 million contract for four sections of the **Conant-Mt. Elliott** relief sewer, started last April and scheduled to be completed next spring. An additional $1.3 million of sewer construction contracts were awarded last year by the Department of Public Works. This work includes a $573,000 contract for Sections 2 and 3 (a 10x10.5 ft double box of reinforced concrete) of the 8.5 mile **First-Hamilton** relief sewer. About $11.6 of sewer construction was completed last year. This year, about $2.8 million of contracts will be awarded. They will include: A storm sewer relief system with pumping station for the **Woodmere District;** a second siphon under the River Rouge just south of Fort St; 6,850 ft of 6-ft 3-in. sewer in tunnel, for the **River Rouge Interceptor;** and sanitary diversion works at the outlet of the **Tireman Sewer** into the Rouge.

- **Detroit (Water)**—The **Northeast Pumping Station and Treatment Plant,** capacity 192 mgd, is now 95% complete. Five

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RESEARCH PIONEERS IN SYNTHETIC RUBBERS

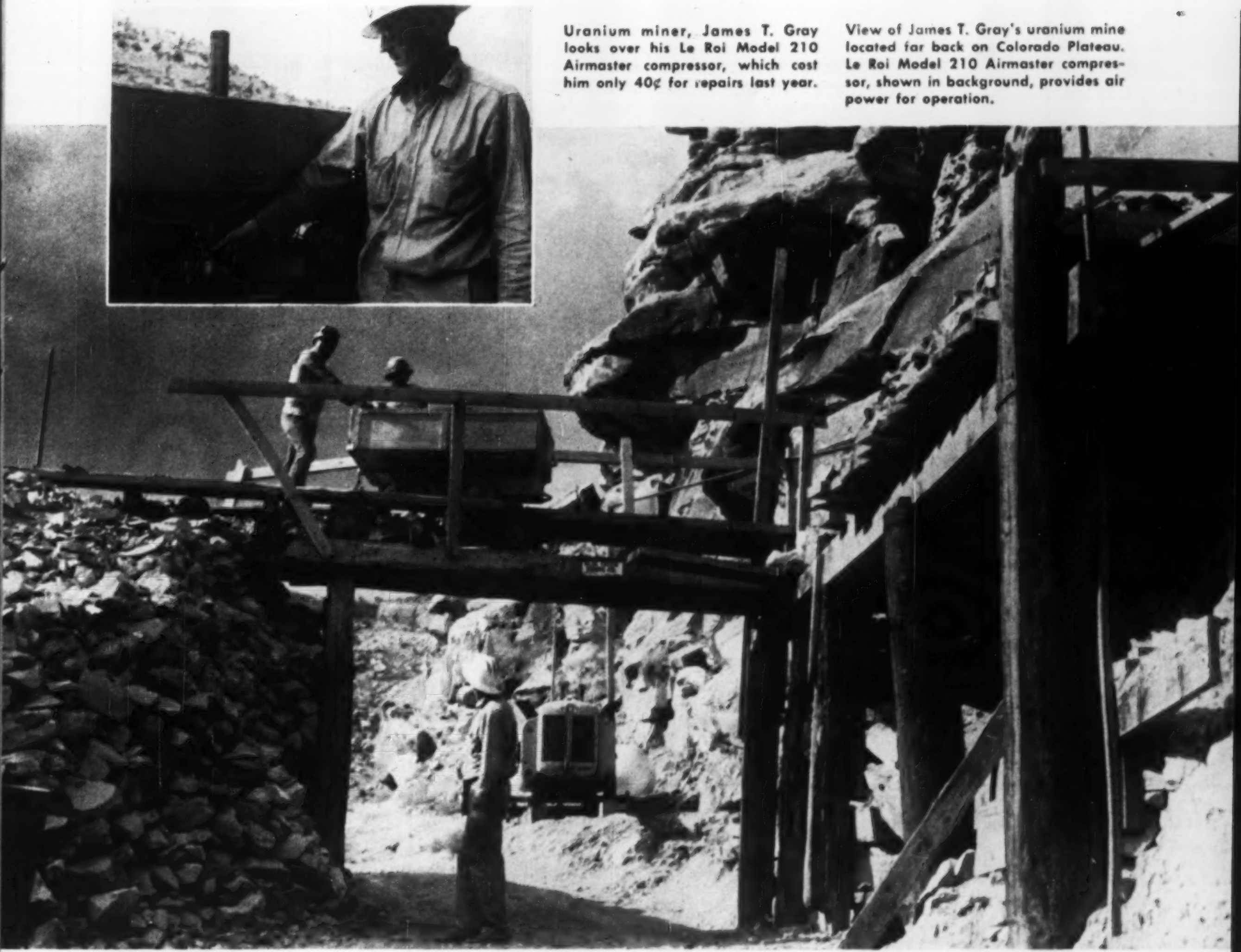
and a half miles of tunnel construction were added to the existing network, some of which extends under the Detroit River. The new tunnel, at an average depth of 85 ft, supplies raw water from the river to the circular low-lift pumping station. In order to house the pumps it was necessary to sink a 94 ft dia concrete caisson with 8 ft thick concrete walls. Large amounts of groundwater made it necessary to place the heavy sealing slab by tremie.

The high lift pumping station, not yet completed, will be in operation in '56. Cost of the treatment plant, pumping station, and raw water tunnel was $31,000,000.

• **East Bay Municipal Utility District (Water)**—More than $4 million was spent on major construction projects during 1955 by this **Oakland, Calif.,** water utility. Reservoir construction worth more than $1.5 million and main installations in the amount of $2.5 million were completed. The largest single project was a $1 million main installation involving 41,000 ft of 24-, 30-, and 35-in. lines. Some $2 million worth of work is in progress on reservoirs and an administration building.

• **Fort Worth (Sewerage)**—Contracts for three major sanitary sewer projects are planned for awarding this year at a total cost of $1.1 million. In addition the public works department will let contracts for about $300,000 worth of submains and laterals. The largest contract to be let this year, for Stage I of the **North Side Collector Main,** is expected to cost about $500,000, with completion scheduled for January 1, 1958. A contract is expected to be awarded in the near future for construction of the first unit of a new sewage treatment plant, estimated to cost about $1.25 million. Last year contracts for $570,000 worth of sewerage construction were awarded and $382,000 of work completed.

• **Fort Worth (Water)**—Last year the public works department awarded 12 major contracts in its waterworks improvement program, totaling $2.6 million. Seven of the contracts were completed at a total cost of $1.4 million, and the other five, totaling $1.2 million, will be finished this year. Major items include 24-in. and 36-in. feeder mains, two 27-mgd pumps for the **Holly Treatment Plant,** two 6-mgd steel reservoirs and almost $750,000 worth of mains in 14 residential areas. This year the public works department will spend nearly $4 million in its waterworks improvement program to keep pace with demands of Fort Worth's population growth. About $1.5 million of additional construction will be placed under contract for the



Uranium miner, James T. Gray looks over his Le Roi Model 210 Airmaster compressor, which cost him only 40¢ for repairs last year.

View of James T. Gray's uranium mine located far back on Colorado Plateau. Le Roi Model 210 Airmaster compressor, shown in background, provides air power for operation.

How 55% of Uranium Miners On Colorado Plateau Cut Air-Power Costs

One miner spent only 40¢ on compressor repairs in year.

Use of LPG fuel means additional savings in time and money.

Latest reports show that 55% of the compressors sold on the Colorado Plateau are Le Roi — the dependable air compressor. Le Roi-Cleveland air legs and rock drills were also selected to help keep costs down on most of these uranium projects.

Take the case of miner James T. Gray, for instance. Even though he's a long way back in the mountains, far from repair parts, downtime and distance don't worry him. One reason is that last year he spent only 40 cents for repairs on his major source of power—a Le Roi Model 210 Airmaster Compressor.

Six cents a gallon fuel savings provide another cost-cutting factor at Jim Gray's uranium mine. This large saving is possible because he runs the Le Roi compressor on liquid propane gas. In a year, the six-cents-per-gallon saving grows into a respectable total.

Dependable fuel supply and bulk purchases give miner Gray further dollar savings. To eliminate dangers of being cut off from fuel supply, he installed an LPG storage tank and hooked it directly to the air compressor. Once a month he fills the storage tank with LPG fuel. From this supply, he gets a steady, reliable flow of fuel for at least 30 days — an important advantage on mining projects far back on the craggy, Colorado Plateau. It's time saving, too, because it eliminates the need for daily refueling of the compressor tank.

Both the engine and compressor in the Model 210 Airmaster are manufactured by Le Roi. This assures you complete dependability and more economy. Le Roi Airmaster Compressors also have removable, copper-finned, individual radiator and intercooler core sections, for efficient cooling under all operating conditions. 100% interchangeable valves are readily accessible for quick, easy maintenance.

Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin also manufactures Tractair and stationary air compressors, air tools, and engines. Write today for information about any of these products.

C-144

CANTON
CORPORATION-LIMIT

Canton Gets a New Concrete Distribution Line

This crew is putting in the fourth piece of pipe in a 4500-foot concrete feeder line for Canton, Ohio. The line runs from the north corporation line south on Broad, west on 8th, and south on Wertz to 3rd where it ties into an existing 12-inch line. Along the route the new line feeds distribution lines of 6, 8 and 12 inches.

The line went in easily and with little interference to traffic. The backhoe in the picture dug the trench and laid the pipe for the entire line. A supply of short lengths and bevel adapters was kept on the job to make on-the-spot turns to clear obstructions. A bevel adapter is a small special made up of a bell ring and spigot ring set back to back at an angle of 2° to 4°.

The line has been tapped three times since it was laid in 1954. The ¾" taps were made by Canton Waterworks crews using their regular equipment and new-design fixtures furnished by the manufacturer of the pipe. The entire line is 24-inch prestressed concrete cylinder pipe made by Price Brothers Company, Dayton 1, Ohio. Price has plants in Dayton, Cleveland and Miami, Fla.

Price

Holly Plant; $700,000 of water line extensions to serve new residential areas; $1.4 million of feeder mains; and nearly $300,000 of storage facilities.

• **Indianapolis (Water)**—The new **Morse Reservoir**, part of a $6.5-million water project by the Indianapolis Water Co., has been completed and impoundment of an ultimate 7 billion gallons of water has been started. Closing of the ½-mi dam structure near Noblesville, Ind., was accomplished late in 1955, and piping and machinery were installed in the control structure in December.

Water stored in Morse Reservoir will flow into the White River, which supplies ⅔ of the requirements of Indianapolis.

• **Jersey City, N. J. (Sewerage)**—Work on a $30-million sewage interceptor and treatment plant was started late in 1954, and is progressing ahead of schedule. Set up as a 2-year job, the program which is designed to control city-generated pollution of both the Hudson River (bounding the city on the east) and Newark Bay to the west, is now about 60% completed.

Two plants, one providing treatment for the eastern half of the city and the other located in the western part, will be primary plants receiving flows from separate interceptors that will cut off raw sewage outfalls along the two shorefronts. Fifteen miles of interceptors, ranging from 24- to 96-in.-dia reinforced concrete pipe, are being installed under widely varied conditions. A maze of railroad tracks have necessitated 40 separate crossings, mostly in tunnel, and soil conditions range from rock to mush.

There are two connections between the plants, one is an electrical conduit and the other is a twin 6-in. cast-iron sludge main through which raw sludge from the eastern plant will be pumped to the west plant for digestion.

• **Los Angeles (Sewerage)**—Design work under Los Angeles' $60 million sewer bond issue (passed last April) was well along by the end of the year. Major portion ($41 million), including modifications of the **Hyperion Treatment Plant**, went to Hyperion Engineers (composed of three firms: Holmes & Narver Inc., Daniel, Mann, Johnson & Mendenhall, and Koebig & Koebig), in one of the largest engineering design contracts ever awarded for a non-federal project. Some $20 million worth of interceptor sewers is being designed by the City Bureau of Engineering. Schedules now call for bids on much of the Hyperion and related construction to go out ahead of schedule early in 1956, including the first half of the north central trunk sewer leading

(Continued on page 188)

GOODALL Waterproof
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Durable, full-cut garments, in rubber, oiled and latex constructions, for every kind of wet-weather work. Made of selected materials, with exacting craftsmanship, they are guaranteed waterproof, assuring complete protection from the elements. Reinforced where extra strength is needed, without impairing comfort and full freedom of movement. Available in a variety of styles, in all sizes. No. 338 Coat is an old-time favorite—double back; corduroy-lined collar; 49" long.

SUITS— Style 80 Jacket with Style 81 Overall makes the ideal shaft suit. Other jacket-and-overall suit combinations to meet every preference or job requirement.

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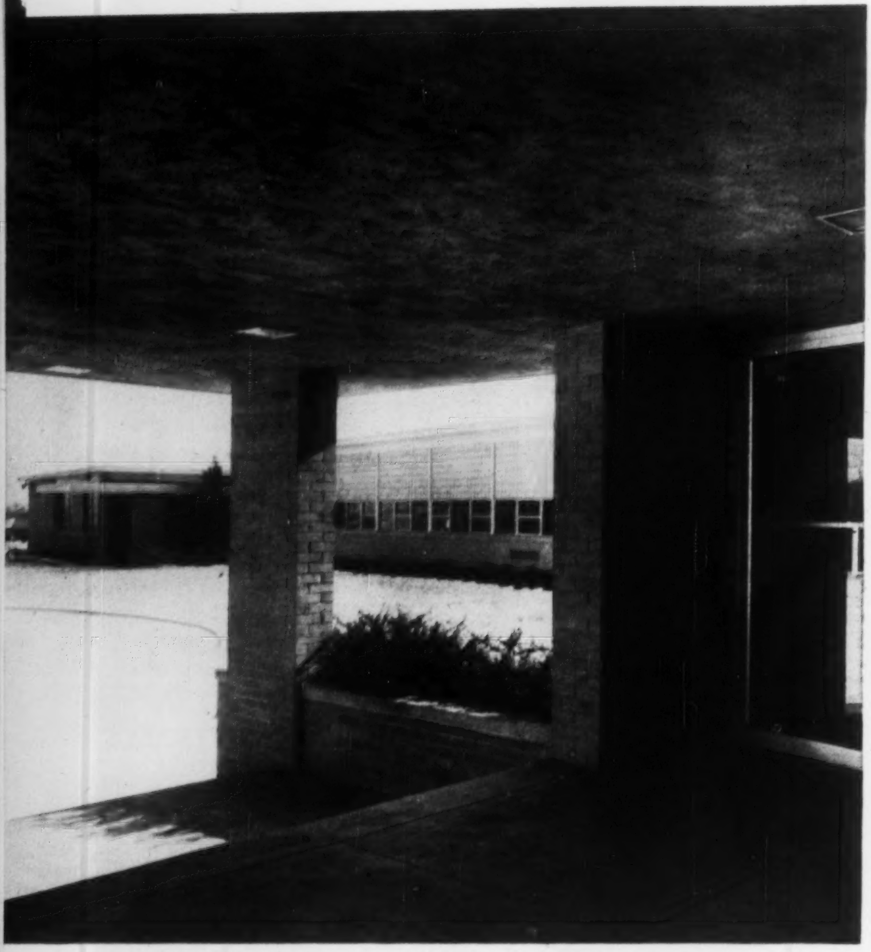


In Pennsylvania—Monroeville Junior High School. Architect—Walter E. Schardt, Pittsburgh; Consulting Engineer—Leland W. Cook, Pittsburgh; Contractor—Guy Miller Company, Pittock, Pa.

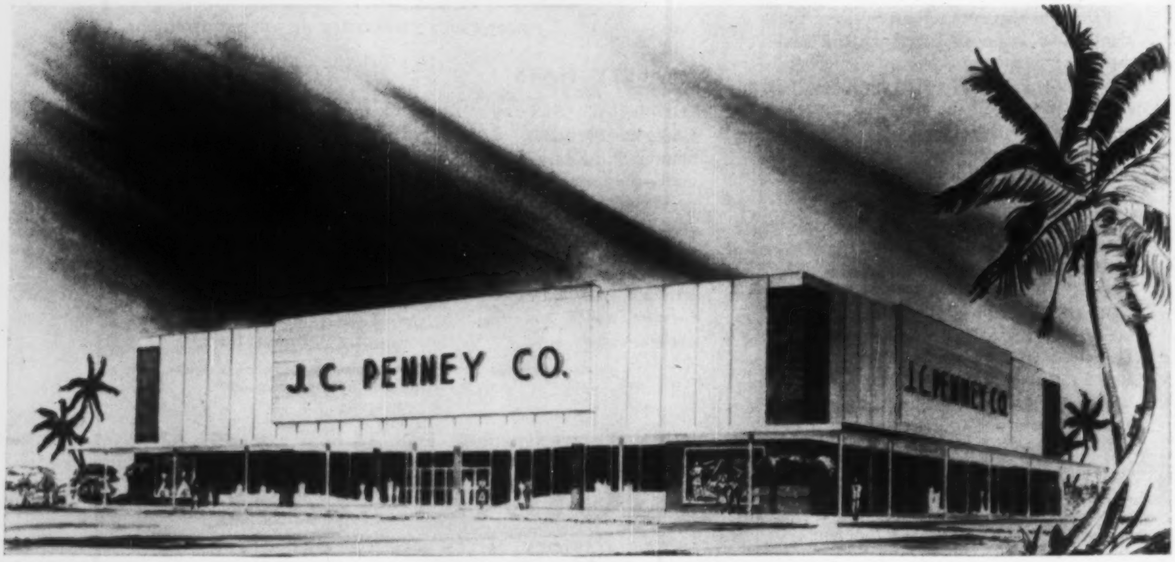
New Buildings Go Up Faster At Lower Cost With Steeltex®

Across The Nation, Designers And Contractors Use Pittsburgh Steeltex Because It Saves Money

In Daly City, Calif. . . . down in Austin, Tex. . . . at Monroeville, Pa. . . . in Hagerstown, Md., Pittsburgh Steeltex is:

- **Helping build better, stronger** buildings of all kinds.
- **Cutting construction costs**—"five per cent," said one builder; "five cents per square foot," said another.
- **Shortening building time**—"we saved six weeks," said the builder in California.

Steeltex, the sturdy steel wire mesh reinforcing which carries its waterproofed form right on its back, was the choice of the men who designed and constructed the representative buildings on these pages. They agree Steeltex does a better job at lower cost.


J.C. PENNEY CO.
J.C. PENNEY CO.

In California—Westlake Shopping Center's J. C. Penney Company Department Store in Daly City. Architect & Engineers—Lloyd Gartner, A.I.A. and Associates of San Francisco; Contractor and Owner—Henry Doelger Builder, Inc., of Daly City.

J. C. Penney Company Store in Daly City, Calif., (lower left), is a totally fireproof department store with 93,350 square feet in its basement, first floor and second floor. The architect said:

"The facility and speed with which Steeltex Floor Lath was installed and the whole operation was completed resulted in a saving of many weeks of valuable construction time."

Henry Doelger Builder, Inc., builder and owner of the Westlake Shopping Center which includes the J. C. Penney store, credits Steeltex with "about six weeks saving in time and about five per cent in cost."

Monroeville Junior High School, near Pittsburgh (upper left) used approximately 110,000 square feet on floor slabs with the contractor, Guy Miller Company, declaring:

"At a conservative estimate, 1½ cents per square foot was saved in time and material as a result of using Steeltex instead of other methods."

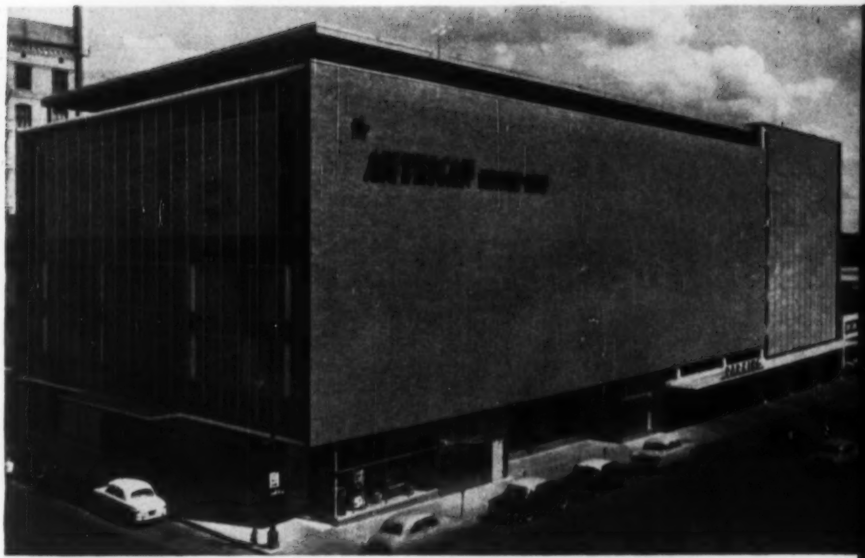
The American National Bank Of Austin, Tex., (upper right) used about 7,000 square feet of Steeltex. Contractor J. M. Odom said: "On steel joist spans under 25 feet with a spacing of not over 32 inches we save approximately five cents per square foot over most other types of deck."

Fairchild Aircraft Division, Office Building, Fairchild Engine and Airplane Corp., at Hagerstown, Md., (lower right) Steeltex was used for 46,000 square feet of office space. The architect estimated "a Steeltex-supported slab over bar joists, spaced 24 inches on center, to be 40 to 45 per cent less expensive than a conventional four-inch reinforced slab using wooden forms, and over steel beams, six to eight feet on center."

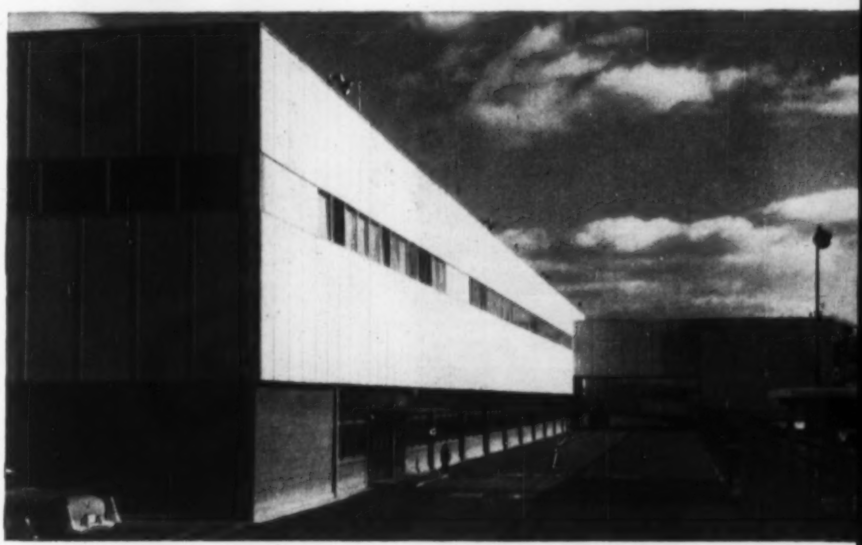
Peter A. Strobel of the consulting engineering firm of Strobel and Salzman said the savings due to the use of Steeltex on the Fairchild building "are quite substantial and, according to our estimate, vary between $.40 to $.70 per square foot."

The Steeltex story is the same in the East, West, North or South. Designers and builders favor Steeltex because it makes better roofs and floors and speeds construction.

You, too, can benefit from Steeltex's advantages. For more details on the Steeltex story, write for the new booklet "Steeltex, Backbone of Concrete, Plaster and Mortar." Or call the nearest district sales office to learn how you can do a better job in less time when you use Steeltex.



In Texas—American National Bank of Austin, Tex. Architect—Kuehne, Brooks and Barr, of Austin; Contractor—J. M. Odom of Austin.



In Maryland—Office Building for Aircraft Division of Fairchild Engine and Airplane Corp. in Hagerstown, Md. Architect—Fordyce & Hamby, New York City; Consulting Engineer—Strobel & Salzman, New York City; Contractor—Calabro Construction Co., Inc., Linden, N. J.

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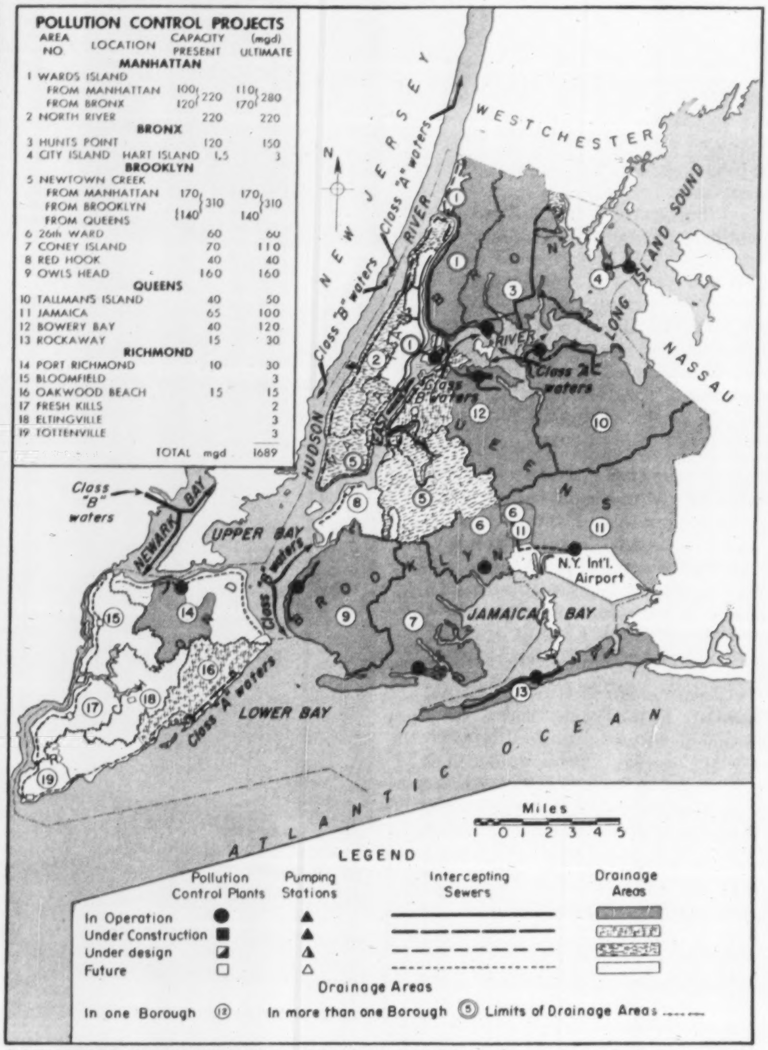

N
NEW JERSEY
WESTCHESTER
NASSAU
LONG ISLAND SOUND
HUDSON RIVER
Class "A" waters
Class "B" waters
Class "B" waters
Class "A" waters
Class "A" waters
Class "A" waters
NEWARK BAY
UPPER BAY
LOWER BAY
JAMAICA BAY
ATLANTIC OCEAN
BRONX
QUEENS
BROOKLYN
N.Y. Int'l. Airport
RIVER
Miles
1 0 1 2 3 4 5
LEGEND
Pollution Control Plants
Pumping Stations
Intercepting Sewers
Drainage Areas
In Operation
Under Construction
Under design
Future
Drainage Areas
In one Borough
In more than one Borough
Limits of Drainage Areas

POLLUTION CONTROL PROJECTS

AREA NO	LOCATION	CAPACITY PRESENT	(mgd) ULTIMATE
	MANHATTAN		
1	WARDS ISLAND		
	FROM MANHATTAN	100 } 220	110 } 280
	FROM BRONX	120	170
2	NORTH RIVER	220	220
	BRONX		
3	HUNTS POINT	120	150
4	CITY ISLAND HART ISLAND	1.5	3
	BROOKLYN		
5	NEWTOWN CREEK		
	FROM MANHATTAN	170 } 310	170 } 310
	FROM BROOKLYN		
	FROM QUEENS	140	140
6	26th WARD	60	60
7	CONEY ISLAND	70	110
8	RED HOOK	40	40
9	OWLS HEAD	160	160
	QUEENS		
10	TALLMAN'S ISLAND	40	50
11	JAMAICA	65	100
12	BOWERY BAY	40	120
13	ROCKAWAY	15	30
	RICHMOND		
14	PORT RICHMOND	10	30
15	BLOOMFIELD		3
16	OAKWOOD BEACH	15	15
17	FRESH KILLS		2
18	ELTINGVILLE		3
19	TOTTENVILLE		3
	TOTAL mgd		1689

NEW YORK CITY'S RIVER-HARBOR CLEANUP program is swinging into Stage II.

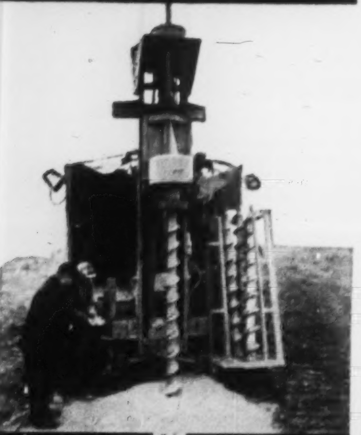
from the treatment plant, initial work on the sludge pumping plant, and the sludge ocean outfall. In April, bids will be called on the second half of the trunk sewer, plus treatment plant modifications, and in September, the effluent pumping plant and effluent ocean outfall. Construction is expected to take about three years.

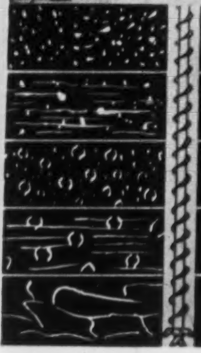
• **Los Angeles (Storm Drains)**—The Los Angeles County Flood Control District continued to make headway on its $179 million storm drain program, started in 1953. In 1955 the district completed 13 projects, and a section of another, at a total project cost of $7.8 million, and another 10 projects and 2 project-sections are nearly complete. At the end of 1955, 28 other projects and 4 other sections, totaling $32 million, were still in progress or under contract. Up to now 26 projects and 8 sections have been completed, at a cost of over $17 million, out of the total 150 projects covered by the program.

• **Los Angeles (Water)**—The Los Angeles Department of Water and Power at the end of 1955 announced an $85 million, 5-year program of extension of its water system. Meanwhile, work is nearing completion on major betterments under way. The main line of the $5.4 million, 10-mi. **Eagle Rock-Hollywood Pipeline,** bringing Colorado River water to the **Hollywood Reservoir,** still has 4800 ft to go on the reservoir end before it is completed, probably mid-1956. However, a 12,000-ft trunk extension in the Hollywood area was finished during the year. The **Stone Canyon Dam and Reservoir,** started in 1954, was completed this year.

(*Continued on page 190*)

DEEPER, FASTER
McCARTHY NEW HEAVY-DUTY
VERTICAL AUGER DRILLS





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SHOT HOLE
DEWATERING
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AUGER DIAMETER	DEPTH OF BORE
20" and 24"	16' to 30'
12" and 16"	60' to 70'

for drilling in earth, clay, compacted sand and gravel, and soft shale formations.

3", 4½", 6", 8" and 9"	up to 125'

for drilling the above, plus drilling in hard sandstone formations.

Choose the most desired size auger for each drilling depth, in any vertical drilling operation. The new McCarthy Model 106-24 Vertical Auger Drill handles augers from 3" to 24" in diameter.

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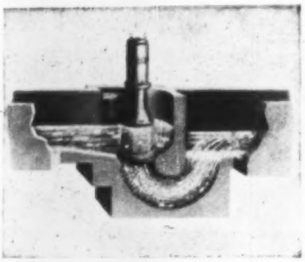
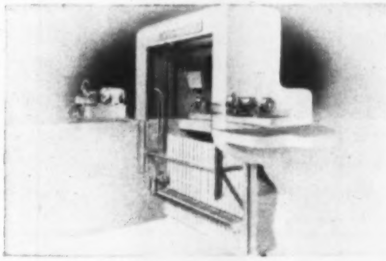
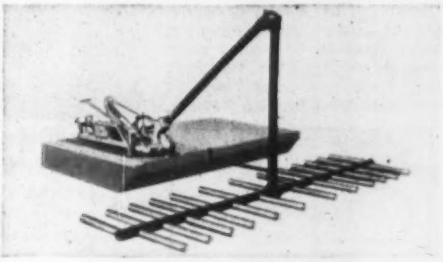


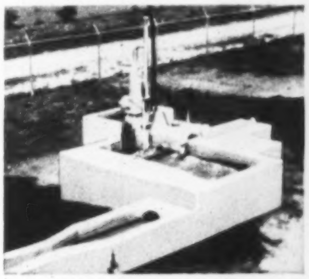
COMMINUTOR



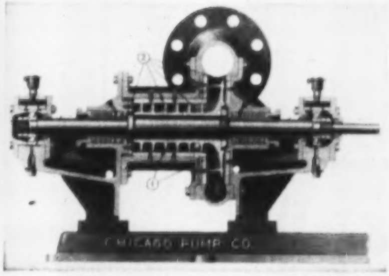
BARMINUTOR



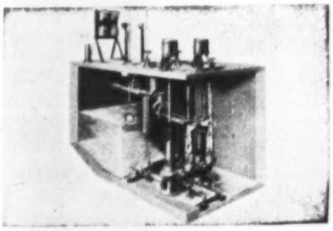
SWING DIFFUSERS



AER-DEGRITTER



SCRU-PELLER PUMP



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- **CHICAGO-SELAS SLUDGE HEATER**
- **CATALYTIC REDUCTION PROCESS**
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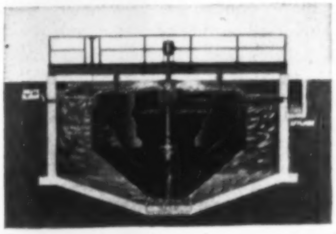
- **CHICAGO STANDARDAIRE BLOWER**



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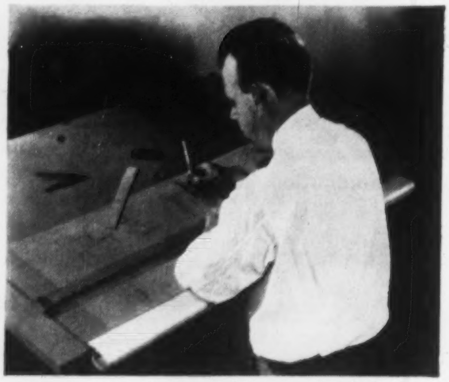

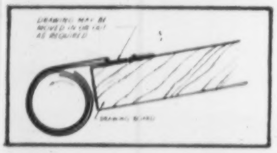

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Water Supply and Sanitation

• **Miami, Fla (Sewerage)**—The $27-million sewage collection and treatment program started in 1953, is nearing completion. The $9.5-million, 47-mgd plant, which is located on a 600,000-cu-yd fill on Biscayne Bay's **Virginia Key**, is slated for completion in April, 1956.

Final effluent will be discharged through a 4,600-ft, 90-in-dia outfall in 20 ft of water. The outfall from the plant to the submarine line is 108 in. dia. 3,200 ft of the 90-in pipe have been laid, and completion is scheduled prior to the plant's completion. Cost of the outfall installation is $1.7 million.

The 14,350-ft, 72-in-dia force main from the mainland to the plant has been completed at a cost of $2 million.

Two contracts are still under way on the mainland. The first, for $7.1-million of intercepting sewers, will be completed early this spring. The second contract, $2.5 million in pumping stations, is about 65% completed, and is slated to wind up in August, 1956.

• **New York City (Sewerage)**—Completion of designs and award of all contracts for the first stage of New York City's pollution control program were accomplished in 1955. (Map on p. 88.)

Contracted work on the extension of the **Bowery Bay Pollution Control Project** was continued and final contracts for completion of the entire project were awarded during the year. The extension will triple the plant's capacity, from 40 to 120 mgd, and provide treatment facilities for a large area of the Borough of Queens, between Flushing and Newtown Creek.

Work continued on **Long Island City's** intercepting sewer, a five-mi-long tunnel generally paralleling the East River and Bowery Bay from the Queensboro Bridge to the plant site (see map). Because of construction difficulties encountered, the cost of the tunnel job, which was estimated at $13.7 million, will be exceeded, and the original contractor is completing the job on a cost basis without profit. The job is ¾ completed.

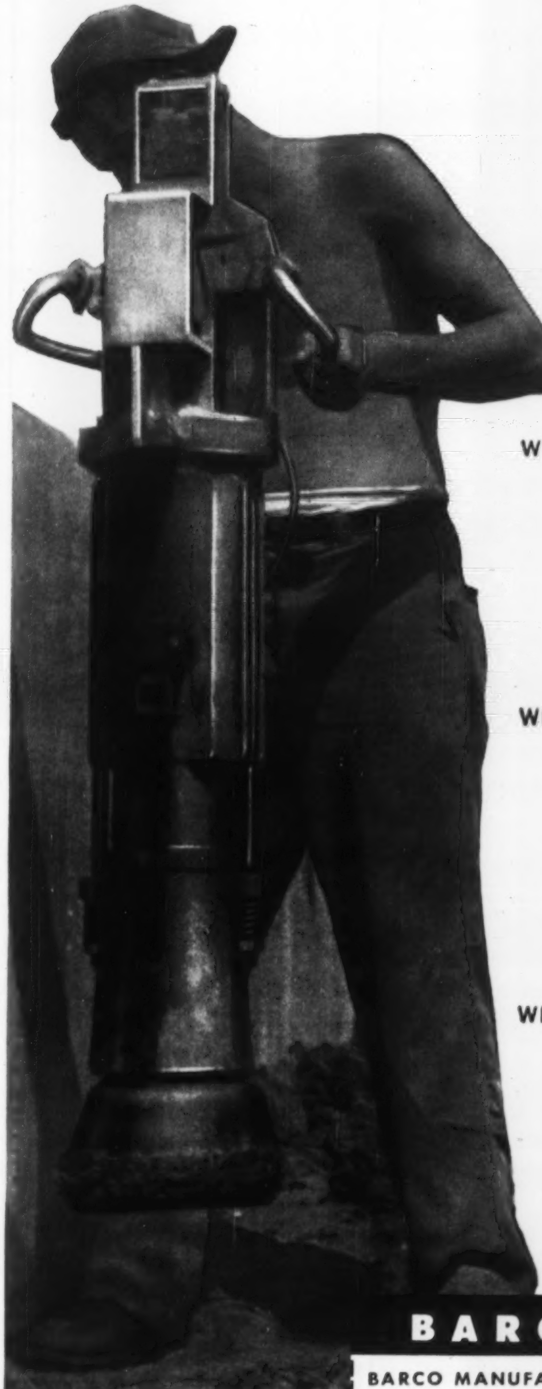
The $3.2-million adjoining intercepting sewer, that roughly parallels the East River, Newtown Creek and Dutch Kills, from the Queensboro Bridge to the upper end of Dutch Kills, was 80% completed by the end of the year.

Contracts for the $795,000 **Borden Avenue Pumping Station** and appurtenant intercepting sewers and force main were awarded during the year and are more than ½ completed.

Construction of sewage flow regulators, tide gates and branch interceptors tributary to the tunnel previously described is slated for completion late in 1956. The contract, awarded late in 1955, is for $1,459,000.

Construction of the plant extension,

WHEN CONSTRUCTION JOBS CALL FOR SOIL COMPACTION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WHEN YOU'RE UP AGAINST A TIGHT SCHEDULE—One of the biggest advantages offered by Barco Rammers is ability to handle work in minimum time. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24″, the rate for 18″ trench is 360 to 600 feet per hour. *When time is at a premium, BARCO PERFORMANCE PAYS DIVIDENDS*—find out about it NOW!

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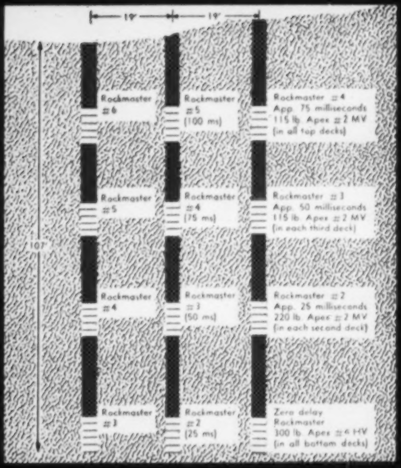
MISSION: Move an 18-ft. burden off a 107-ft. quarry face. Get good breakage—but no complaints.

METHOD: "Triple Deck" each hole and shoot each deck separately with ROCKMASTER® millisecond delays. Blast initiated at bottom of each charge for maximum confinement. (Note movement, at ⅓ second, lower right.)

At full second, entire burden is in motion. Toe leading . . . excellent control. Sound muffled . . . little vibration.

Low final muck pile . . . well spread. Excellent breakage . . . little work for the drop ball.


19'
19'
107'
Rockmaster #6
Rockmaster #5 (100 ms)
Rockmaster #4 App. 75 milliseconds 115 lb. Apex #2 MV (in all top decks)
Rockmaster #5
Rockmaster #4 (75 ms)
Rockmaster #3 App. 50 milliseconds 115 lb. Apex #2 MV (in each third deck)
Rockmaster #4
Rockmaster #3 (50 ms)
Rockmaster #2 App. 25 milliseconds 220 lb. Apex #2 MV (in each second deck)
Rockmaster #3
Rockmaster #2 (25 ms)
Zero delay Rockmaster 300 lb. Apex #4 HV (in all bottom decks)

Blast uses six ROCKMASTER delay periods in three 107-ft. holes. 750 lbs. of Apex® quarry and stripping explosives loaded in separate decks in each hole.

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Ask *your* Atlas representative about ROCKMASTER—the modern blasting method that gives you quiet efficiency, saves explosives, and adds a "good neighbor policy" for a bonus.

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PUBLIC RELATIONS AND BLASTING

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started in November, 1954, is scheduled for completion late in 1956 also. An unusual feature of the $13.7-million plant alteration is a difficult underpinning of the existing pump and blower building to safeguard it against settlement when the new pumping station is built next to it.

Total cost of the Bowery Bay with all interceptor and pumping station work will exceed $33 million.

The final project on the Stage I program is the **Oakwood Beach Pollution Control Project** in the Borough of Richmond (Staten Island). Contracts for construction of the 15-mgd. activated sludge treatment plant were awarded in January, 1955, and work is slated for completion in mid-summer of this year. Accessory to the plant is an intercepting sewer, already completed.

Placing in operation of the expanded Bowery Bay plant and the Oakwood Beach plant will mark completion of the first stage construction schedule, with all sewage originating within New York City limits receiving treatment. The first stage, which included **Owl's Head, Hunt's Point, Rockaway, 26th Ward, Port Richmond, Bowery Bay** and **Oakwood Beach** sewerage and treatment projects, was undertaken in 1948 at an estimated cost of $100 million. Upon completion, the cost will have risen to an estimated $120 million.

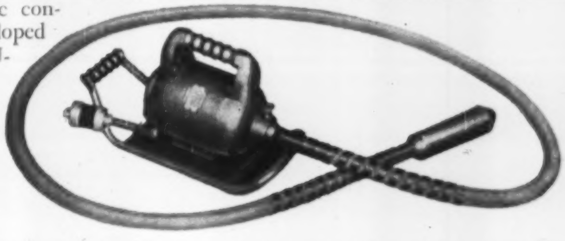
The second stage of the New York City program, originally estimated to cost $175 million, will now cost in excess of $200 million because of increased construction costs since 1948 when the "consent order" agreement between the city and the Interstate Sanitation Commission was signed. Originally scheduled for completion in 1959, the Stage II program will be extended through 1963 if the city's application to the commission is acted upon favorably.

Largest of the Stage II projects is the $80-million **Newtown Creek** program that will include a treatment plant, the Manhattan pumping station, the Manhattan, Brooklyn and Queens intercepting sewers and a deep-rock tunnel under the East River.

Next in size is the **North (Hudson) River** project, which is estimated to cost more than $40 million for a plant, a pumping station and sewers. Though the North River project was not originally on the Stage II agenda, the plant and sewerage facilities were added to the city's master plan in June, 1955, when it was found that construction of the plant would reduce size and construction cost of the Wards Island project extension. The change in plan, whereby the flow from northwestern Manhattan will flow to the North River facility, instead of being conveyed to the Wards Island plant, will save about $25 million in construction costs.

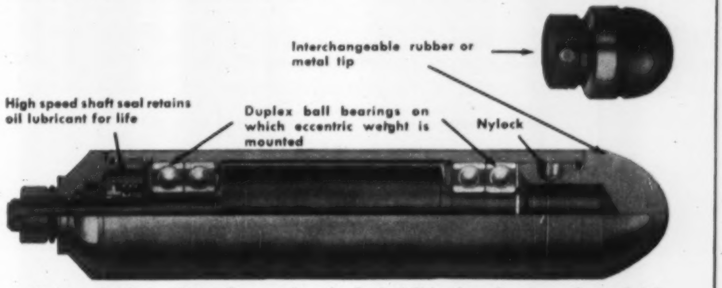
The major pollution control projects of

New, rugged electric vibrator, newly designed vibrator head, delivers 9000 VPM at 2 HP



This new electric concrete vibrator, developed by STOW MANUFACTURING COMPANY, Binghamton, N. Y., features a new lightweight vibrator head that delivers, at high amplitude, 9000 vibrations per minute to the mix.

This vibrator, STOW model BU, is powered by a totally enclosed 2 HP Universal motor, operating on 115 volts, AC or DC, 25 to 60 cycles. The motor is protected by a skid mounting, so arranged that the unit can be easily pulled around by the flexible shaft.


Interchangeable rubber or metal tip
High speed shaft seal retains oil lubricant for life
Duplex ball bearings on which eccentric weight is mounted
Nylock

Take a look at this vibrator head. It is 10 inches long, and available in diameters of 1¾, 2 and 2½ inches, capable of 9000 VPM. Vibrations are achieved by use of an eccentric weight mounted in special high speed duplex ball bearings at each end. The outside of the head is case hardened, for extra long wear, and it has a replaceable tool steel tip. Stow estimates that these two improvements alone will double the life of the heads.

CONSTRUCTION MEN report that they like the light weight, the long life, the low replacement cost, and the terrific wallop of these heads. Weight of the 1¾" head is about 5 lbs.; the 2" head about 7½ lbs.; the 2½" head, about 9 lbs. The cost of this head is less than ¼ the cost of expensive "motor-built-in" type heads.

The 1¾" head is also available with a hard rubber tip for use where plywood forms are being used.

For more information about the complete line of STOW concrete electric and gasoline vibrators, vibrating screeds and rotary trowels, contact your STOW distributor, or write for STOW catalog 552!

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7
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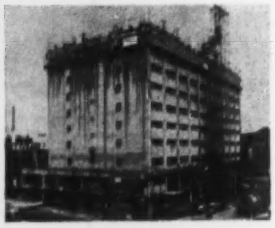
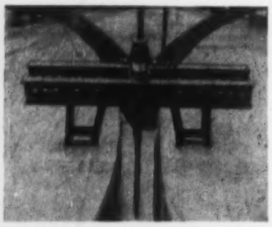
3
Concentric
Walls
143 ft. High

Ft. Hood,
Texas, 1954



8 STORIES—5 DAYS
including interior walls
Memphis, Tenn., 1955



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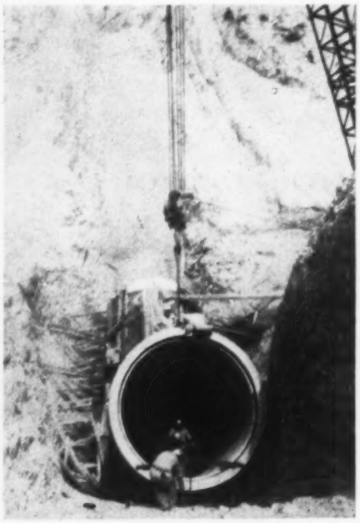
the second stage undergoing design during 1955 were the **Newtown Creek Plant** and intercepting sewers, and the **Riverdale** and **Marble Hill Intercepting Sewer**, pumping station and force main of the **Wards Island project.**

• **New York City (Water)**—The Board of Water Supply, following its 1954 success in obtaining permission for diversion of an additional 360 mgd from its Delaware River source—up to that time 440 mgd was the limit—obtained final approval of the city's mayor and board of estimate for appropriation of the necessary funds to begin construction on the third stage of the **Delaware River Project.** Included are a dam and reservoir of over 90 billion gal. capacity on the West Branch of the Delaware River and a 44-mi aqueduct tunnel to **Rondout Reservoir**, which was completed under an earlier stage. Two major contracts, the west portal, three shafts and 19½ miles of tunnel were awarded in November, 1955.

Work continued through the year on development of the second stage of the Delaware project. Diversion of water from the Pepacton Reservoir, started in January, 1955, and the reservoir, with its Downsville Dam release works and 25-mi **East Delaware Tunnel** to Rondout Reservoir, was completed sufficiently to be placed in full operation on September 1. This operation supplies water to N. Y. C. by by-passing the hydroelectric plant at the outlet of the tunnel. The plant is expected to be put into operation early this year. Other work included in the second stage of the Delaware project was initiated under a contract for a sewage treatment plant for the Villages of Margaretville and Arkville at the upper end of Pepacton Reservoir.

• **Philadelphia (Sewerage)**—1955 saw substantial completion of the $80-million construction program to provide collection and treatment of sewage for the entire city of Philadelphia. More than $67 million had been spent on the program at the end of the year, and remaining work consists of interceptor completions for the most part.

The **Northeast** and **Southwest Treatment Plants** were completed in 1951 and 1954, respectively, and the final treatment facility of the pollution control program began operating in December, 1955. The latest addition, **Southeast**, was started in 1948, and has cost $7 million to build. $11-million worth of interceptors—including and operating 8-in raw-sludge force main that connects the Southeast plant with the sludge digestion tanks at Southwest—are nearing completion. More than eight miles of the main interceptor, 13-ft dia air tunnel, have been driven to cut off raw sewage outfalls that now empty into the Delaware River.



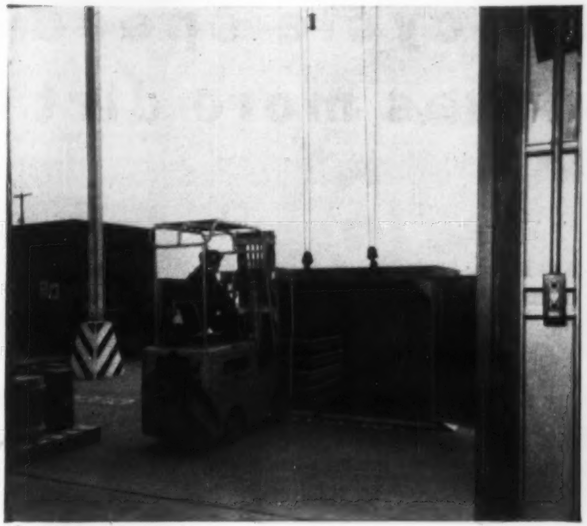
A 108-IN. PIPELINE project constitutes one part of Southern California's $75-million expansion program to allay thirst.

• **Philadelphia (Water)**—Four city water plants, all about 50 years old, have construction programs under way or planned.

Torresdale Plant, serving the northeastern portion of the city, is undergoing complete renovation, which will increase its output to a 285-mgd average capacity with a filtration rate of 2 gpm per sq ft of filter area. This plant will be able to take an overload to 423 mgd when it is completed. Old slow sand filters will be abandoned as soon as new rapid sand filters have been completed. Entirely new, too, and under construction are a chemical building and basins. Of the total cost of $17 million, $7 million is under contract and an additional $3.5 million is being advertised this month.

The **Queen Lane plant,** originally of 100-mgd capacity, is also an old style plant with outmoded slow filters and chemical handling facilities. In 1955, $4 million was spent for a new chemical building, the first modern basins and reconstruction of filters. Filter reconstruction is being carried out on 25% of the plant's filters at a time. They are being rebuilt in place, without shutting down operations of the unaffected units. Bids were taken Dec. 20, 1955 for about $5-million work—about two years—of construction.

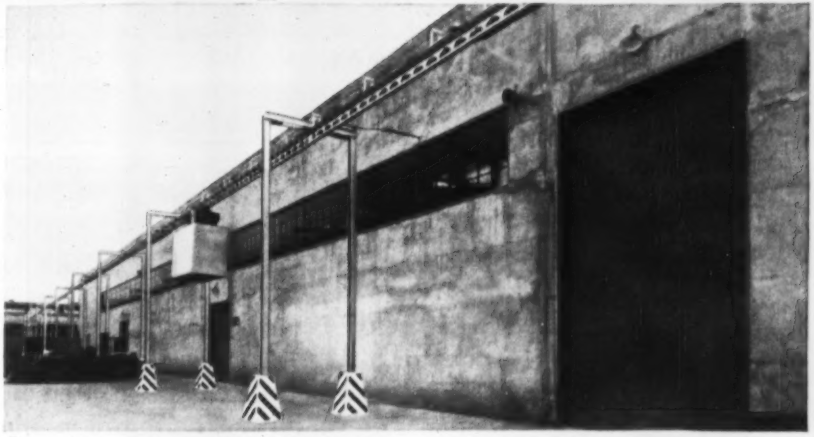
The other two plants that are due for change are the **Belmont Plant,** now operating at 70 mgd, and the **Roxborough Filter Plant,** which will be abandoned when the Torresdale plant is completed. Belmont had a reconstruction start in 1947, when one-half the plant was converted to an ozone plant. The second half, 35 mgd, will be modernized in 1957, in the manner of the Queen Lane plant,



1.

2.

1. Loading carrier van with power truck.
2. Up she goes. Depressing wall button sends carrier on its way.
3. En route to another building.



3.

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MANITOWOC faster cycle speed moves more dirt

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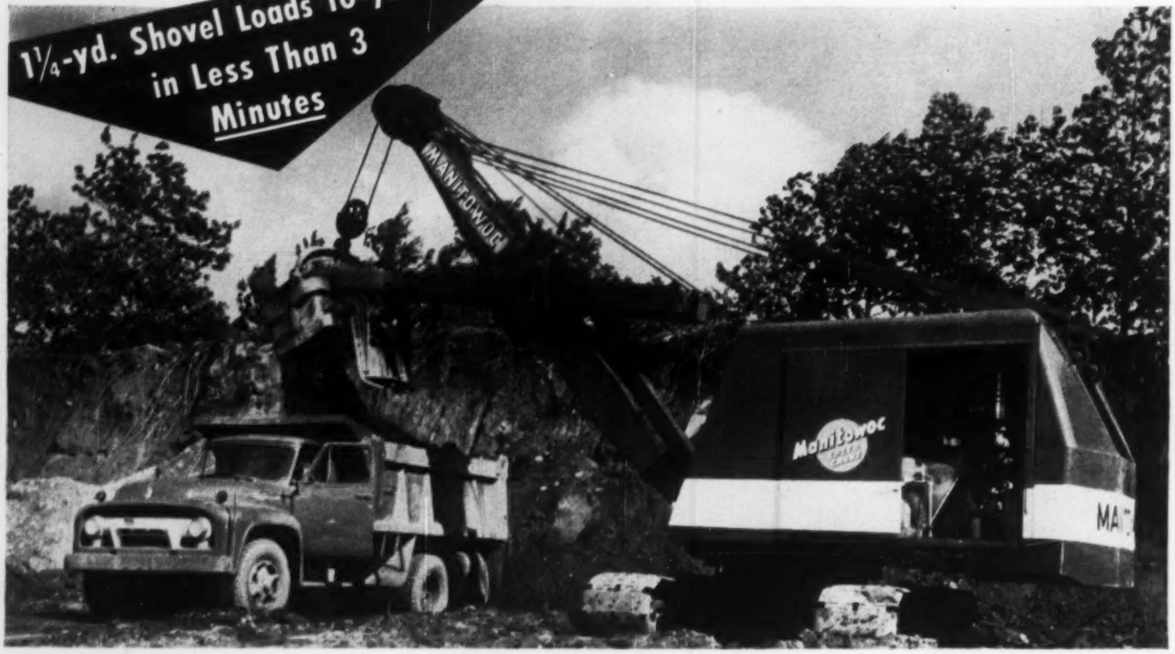

Leveling ground at a Staten Island borrow pit recently, contractor Peter Juzefyk, Elizabeth, N. J. excavated approximately 100,000 yards of gravel fill to complete the job. Juzefyk averaged 2 minutes – 50 seconds time to load 16-yd. haul units with his Manitowoc Model 2000 1¼-yd. shovel. Total loading time often included a move to place the shovel in a better digging position! As much as 2100 yards was removed from the site in one 9 hour shift.

Why MANITOWOC 2000 does a faster job

FULL USE OF POWER speeds digging. Only 13 gears and pinions make more power available at all times to add horsepower at the dipper (only working gears turn). SMOOTH, DISC-TYPE CLUTCHES speed operation — make control extremely precise. As easily adjustable as automobile-type clutches. SIMPLICITY OF DESIGN and smooth operation greatly add to cycle speed. Sliding pinion arrangement uses just one set of clutches to travel, swing and boom hoist. FAST TRAVEL with extra push for grades up to 30%. Positive steering utilizes either crawler, forward or back. Rugged, simple crawler base has balanced stability needed for digging on uneven terrain. EASILY CONVERTIBLE in the field to crane, dragline and trench hoe operation — whatever front end the job demands.

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Speedcrane
SHOVELS 1-5½ YD.
CRANES 20-100 TON

On your next bid let Manitowoc speed and power help cinch the deal. Contact your helpful Manitowoc distributor for the full, profitable story.

with reconstruction of the slow filters in place.

• **Pittsburgh (Sewerage)**—After a long period of planning, the **Allegheny County Sanitary Authority**'s $100-million sewage-treatment program was given the green light, and in 1955, was off to a flying start. To January, 1956, $17 million in treatment plant contracts and $61 million in sewerage contracts had been awarded.

The big program, with contractors striving for a 1958 completion, will serve a 180 sq mi area that includes Pittsburgh, and 66 other municipalities. Work will include a treatment plant on 50 acres of ground and 64 mi of trunk lines that will intercept outfalls on the Allegheny, Monongahela and Ohio Rivers and tributaries.

The 150-mgd plant will use the Laboon process—concentration of sludge by floatation under controlled temperatures—which was demonstrated by John F. Laboon of the Allegheny authority in a pilot operation, and later was chosen as the process for treatment of Charlotte, N. C., wastes.

• **Portland, Me. (Water)**—Construction on the **Falmouth Feeder** in 1955 exceeded the 18,116-ft linear footage of 1954. During the past year, the Portland Water District installed 1,040 ft of 48-in-dia pipe, 4,684 ft of 42-in, 12,652 ft of 36-in and 1,418 ft of 20-in. pipe for a total of 19,795 ft. The pipe program was undertaken to tie the system into existing Falmouth distribution lines.

The district constructed a ball-and-socket type, 12-in submarine line from Mackworth Island to Andrews Avenue in Falmouth, a distance of 2,600 ft. The new line replaces another 12-in submarine crossing that has given increasing maintenance trouble as a result of leaks.

The district also constructed 5,909 ft of 60-in-dia tie line between 42-in cast iron and 42-in concrete feeder mains supplying Portland, and the 48-in feeder to Falmouth. The remaining 4,000 ft of this line will be completed in 1956.

• **Providence, R. I. (The Blackstone Valley Sewer District Commission)** has phase II of its work under way. It consists of 3.84 mi of sewer interceptor, which was joined to the existing system in December, 1955 and an additional 3.34 mi of sewer that was awarded at a cost of $1.57-million. The first mentioned project, involving 6,000 ft of 48-in interceptor sewer and approximately 14,000 ft of appurtenant sewer work, was completed in 1955 at a cost of $1.44 million. The second phase has been awarded and will be completed late this year or early 1957.

• **Salt Lake City (Sewerage)**—The Salt Lake Suburban Sanitary Sewer District sys-

(*Continued on page 200*)

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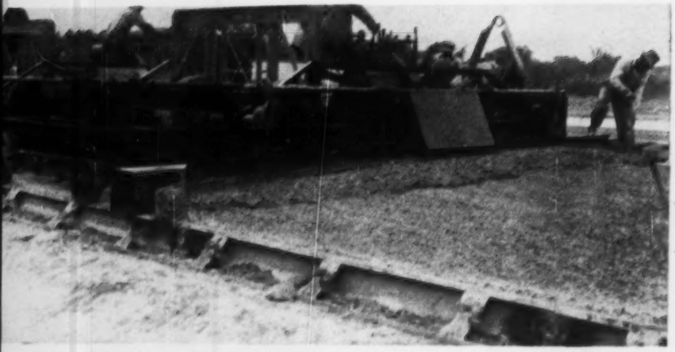
Self-widening machine



Two Flex-Plane Finishers used in tandom by A. J. Baltes Construction Co., on section of Ohio Turnpike

Western Contracting Co. operated two more on still another section of Ohio pike.

FLEX-PLANE

J. C. O'Connor and Sons operate Self-Widening Flex-Plane on section of Indiana Turnpike.

J. A. Tobin uses Flex-Plane working low slump concrete on section of U. S. 69 near Kansas City, Mo.

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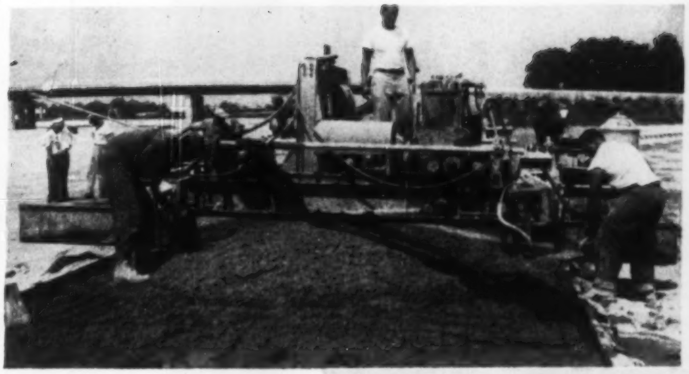

Self-widening machine used by Peter Kiewit on a midwestern turnpike interchange.

The Flex-Plane machine takes gradework in stride. Here Harrison Construction Co. works cloverleaf with a self-widening unit.

9892

Here's the finishing machine that has outsold all others for the past two years. The Flex-Plane has been the most flexible machine of its type ever built . . . and the 1956 model is no exception.

Upon a sturdy triple-lap frame, that extends hydraulically at the flick of a finger, is a power-packed engine that will easily handle the toughest finishing jobs. Users often work them without spreaders.

There is the Flex-Plane originated hydraulic transportation rig that transforms the machine into its own trailer in a matter of seconds. And, the Flex-Plane Self-Widening feature, that proved so popular last year, has been improved for 1956.

Add to these outstanding features the new Flex-Plane screed that holds rigid and true under any condition, yet takes a crown speedily, with a minimum of down time. Remember, too, Flex-Plane screeds are outside the frame where they belong for easy maintenance and better finishing.

Again we say, look them all over, talk to users, and we're sure you, like dozens of other leading contractors, will specify Flex-Plane Finishers from this point on.

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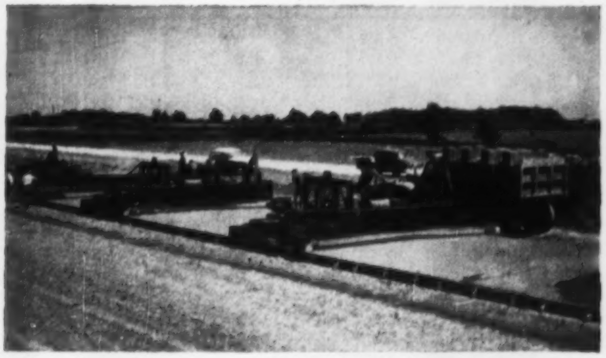
While working turnpike Calumet Construction Co. found Flex-Plane flexibility paid dividends.

On Garden State Parkway the Weldon Construction Co. put their second Flex-Plane through its paces.



The Union Building and Construction Corporation uses a pair of Flex-Planes to finish slabwork on Indiana Turnpike.

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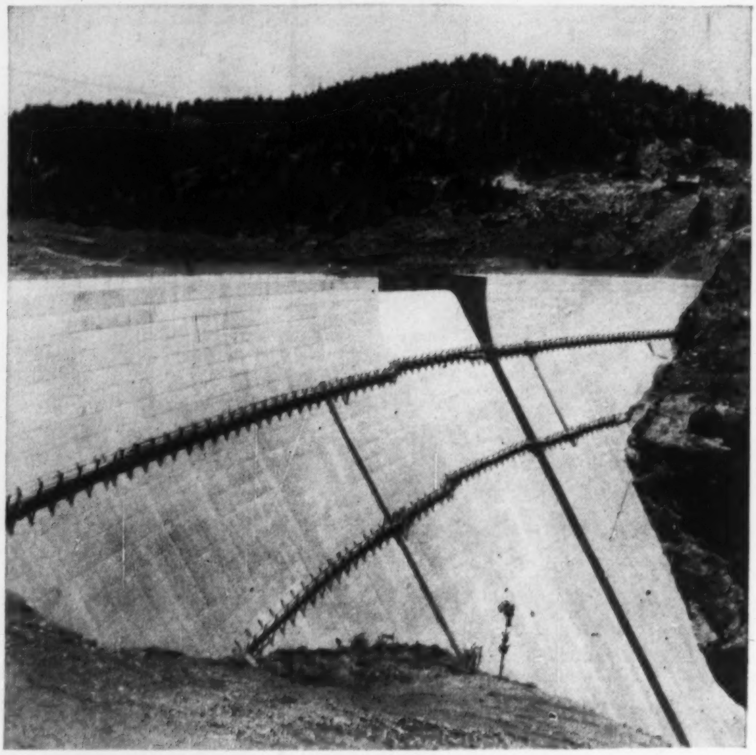

GROSS DAM, a 340-ft-high gravity-arch structure will store water for Denver.

tem is 40% complete on $9 million of work. The construction is behind schedule. Trustees of the district say the installations and clean-up will be finished in 1956.

• **San Francisco (Water)**—The 20-mi. Sunset supply line, which will bring water to the **Sunset Reservoir** in San Francisco from the **Crystal Springs Reservoir** on the Peninsula, is scheduled for December completion. The last contract, in the amount of $2,350,000, has been awarded for one mile of tunnel. Some 7500 ft of pipeline, to be laid upon completion of the tunnel, will bring the project to a close.

• **Seattle (Sewerage)**—The Southwest Suburban Sewer District awarded contracts in the fall of 1955 for 50 mi. of 8- to 36-in. sewers and a primary treatment plant, costing a total of $3 million. This work is scheduled for completion next October. Additional work costing $2 million is proposed for the future. To the north of Seattle, the Lake City Sewer District has $6 million available for the construction of sewers but cannot start work until the City of Seattle builds a treatment plant. Funds for this plant may be provided in a municipal election next March.

• **Southern California (Water)**—Metropolitan Water District of Southern California has doubled its expansion program, begun in 1952, over last year's estimated total of $75 million. The additional construction is designed to bring the main **Colorado River Aqueduct** and its distributing lines to full delivery capacity of 1,212,000 acre-ft. annually.

In 1955, some $18 million was spent by the district on construction, with an even higher figure planned for 1956. Work on two additional pumping units at each of the five 3-unit pumping plants, plus new pump delivery lines, was brought to 85% completion during the year, and full installation is expected to be accomplished during 1956. Start on a sixth pump at each plant is planned for 1956, which will bring total capacity per station to 1200 cfs.

Four contracts, totaling 21 miles and $8 million worth of distribution lines, were finished in 1955, and another $4.8 million, 5.1 miles of 108-in. line, was nearly finished. The $3.9 million, 500-mg **Garvey Reservoir** was placed in operation in May, 1955, and the $5.8 million middle-feeder line section, leading from the reservoir south toward the harbor area, was also in use during the year. The 1.3 mile 10-ft dia. **San Juan Tunnel** was in the final stages. In addition, some 32 miles of steel and concrete distributing lines, worth $19 million, were under construction at year's end. Other distribution-line work, esti-

MT. VERNON TARP HELPS EAST MEET WEST—Western Contracting Corporation is using Mt. Vernon duck as a roof tarp for their equipment maintenance shop while building part of the Indiana East West Toll Road. Manufactured by the Hoosier Tarpaulin & Canvas Goods Co., Inc., the huge tarp is suspended over two portable work shop trailers and provides a work area 34 x 65 feet. Canvas side drops provide protection against all kinds of weather.

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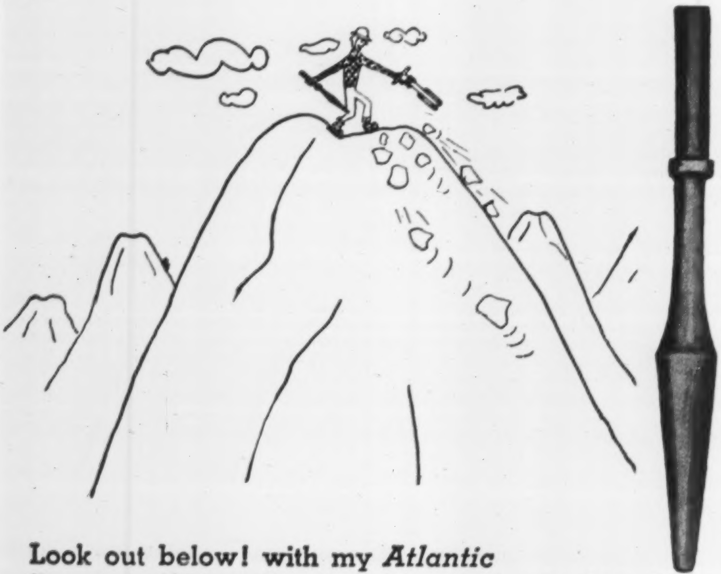

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mated at $15 million, plus 12 miles of planned aqueduct siphon construction at 47 locations will require award of contracts in 1956 of over $25 million.

• **Spokane, Wash. (Sewerage)**—Spokane hopes to call bids in 1956 and build a $1.5 million disposal plant in the northwest section of the city to complete its $4.7 million disposal project. During 1955 final design of the plant was approved by the Washington Pollution Control Commission, but bidding and construction have been delayed nearly a year by court action on behalf of residents who oppose the proposed location. Two secondary interceptors (one 4000 ft, the other 2 mi. long) and three pumping plants remain to be built. The disposal plant will enable the city of 182,000 to treat about 80% of its sewage.

• **Tampa, Fla. (Sewerage)**—A major portion of sewerage operations was aimed at providing sanitary sewer service for densely populated areas annexed to the city in 1953. This phase of the program is proceeding with funds raised in 1954 through sale of $10 million in sewer revenue bonds.

During 1955, fourteen contracts were signed with eight different contractors for construction of eight pumping stations, ten miles of trunk and intercepting sewers and 92 mi of lateral sewers. Total contract awards amounted to approximately $5.5 million.

• **Washington, D. C. (Water)**—The water supply division of the Washington District Engineer's office has two water projects under construction in its jurisdictional area. The first is the $4-million, 477-mgd, 15-vertical-pump **Dalecarlia Pumping Station**, which will supply four service-level areas within the District of Columbia, Arlington County and Falls Church, Virginia and, during emergencies, it will provide small quantities to Metropolitan Maryland. The second is the $4.5-million **Little Falls Raw-Water Intake Works**, which includes a 1,500-ft-long concrete diversion dam across the Potomac River and a reinforced concrete pumping station.

The Dalecarlia pumping station will consist of an underground reinforced concrete substructure, with a headhouse and electric substations above ground. The underground portion (205 ft long, 101 ft wide and 47 ft deep) is about ¾ completed.

Prior to award of construction contracts, all electrical, pumping and control equipment, valves, piping and fittings for the projects were procured by the government under supply contracts, for installation by contractors. This procedure, aimed at expediting construction, necessitated construction of a temporary metal warehouse, sealed and air conditioned, to protect the stored equipment during the construction period.

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If you are planning to build in an area that may possibly be affected by flood conditions, your best insurance is dependable foundation construction. While replacing stock and equipment as a result of flooding is certainly not a simple task, it is nothing compared to the repair or reconstruction cost of a complete building or plant.

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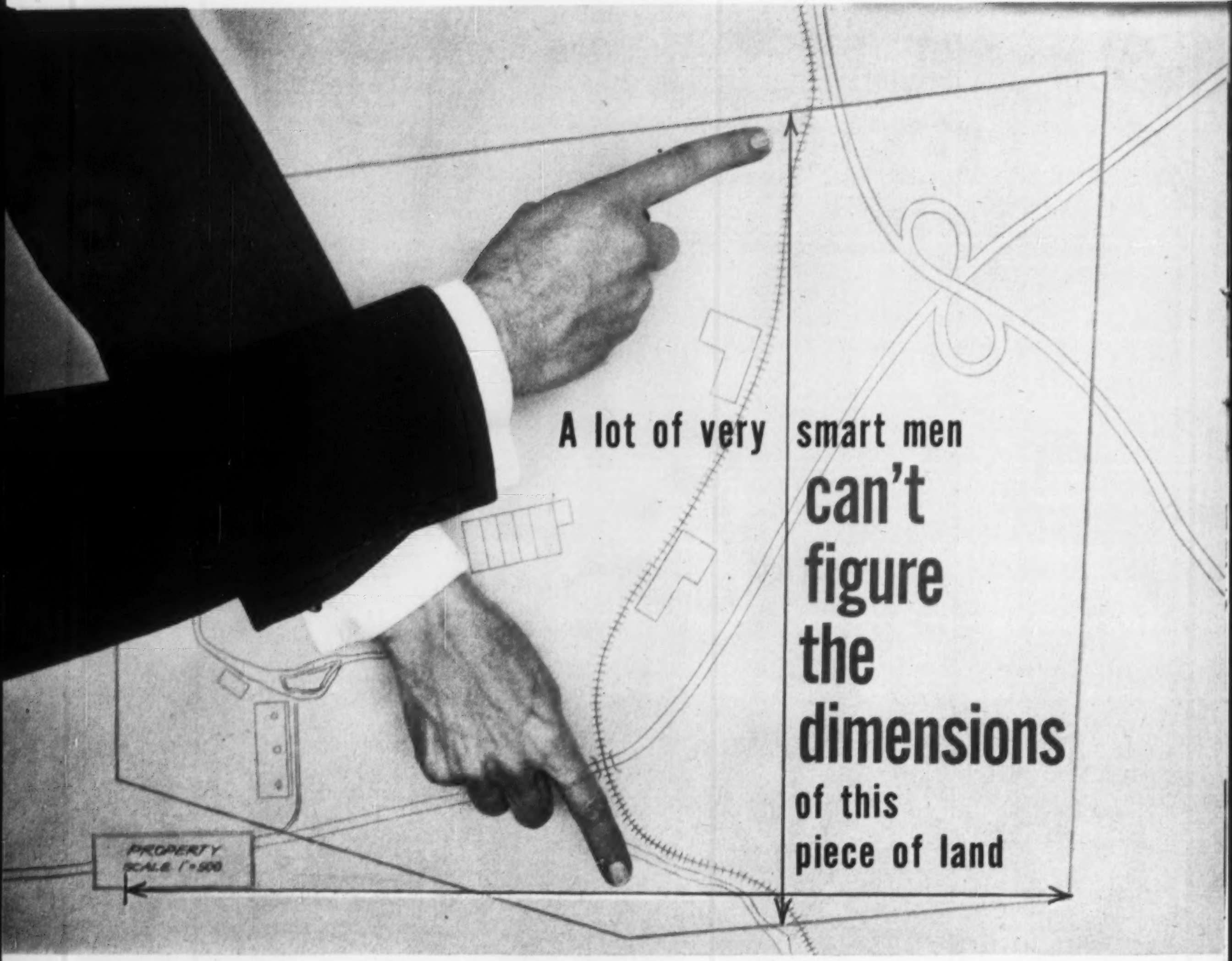

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There's length and width, of course—and that's about as far as most real estate measurements go. Even on the big important deals. But land has *depth*, besides. Distance down. The biggest dimension of all. And the one wherein may lie the land's real value. Or the lack of it.

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If you would like a better third-dimension picture of land you own or plan to buy, you'll do well to talk with a man from Manu-Mine.

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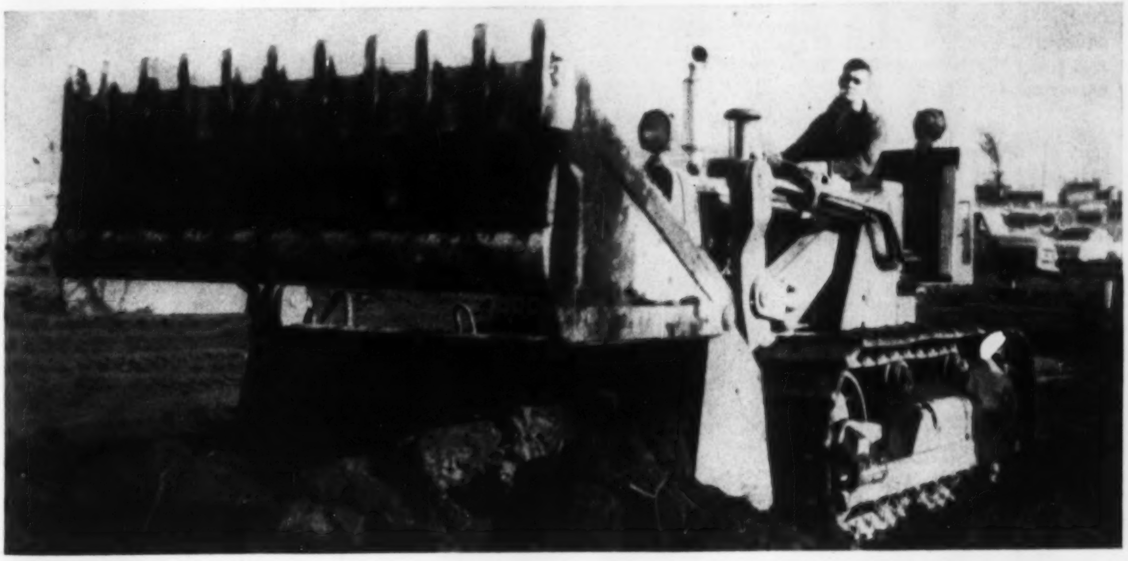

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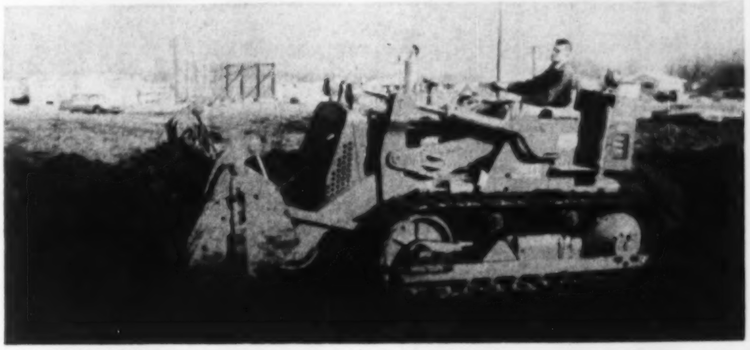

BLADE DOWN, the attachment acts as a 2½ yd skid shovel.

A 2½ yd skid shovel that doesn't tie big crawlers down to one specialized operation is now available for the International TC14. The versatile hydraulic-controlled rig converts instantly from skid-shovel to bullclam, clamshell or bulldozer with the flick of a lever.

The maker, Drott Mfg. Co., says the unit was designed for the average owner of a shovel-loader who frequently needs a bit of bulldozing or close-controlled stripping or grading in his operation. Too often, such operators try to get by without attaching a bulldozer blade. Drott also claims it's possible to skid a bigger load than can be carried; to pry out bigger chunks than units can lift straight up; to bulldoze more precisely by controlling blade pitch; and with bottom opening buckets, to dump into higher haul units and bins.

As a skid-shovel, the new unit gives a pry-over shoe break-out action of over 17,000 lb, plus a 42 ground-level bucket roll-back—a very necessary feature for carrying big bucket loads. It will dump with a 9-ft clearance.

As a bulldozer, the 94-in. blade has a cutting edge and shoes that ride on the ground, giving a skidding action. Depth of cut is regulated by a hydraulic radius control, or forward and backward pitch of the blade, rather than by the lifting and lowering of push-beams. The radius control is so sensitive that cuts can be made in one-inch increments, Drott claims.

As a bullclam, the clam becomes a depth gauge. When loaded, the operator closes the clam, tips back the bucket on the skid-shoes, and skids the load along the ground.

As a clamshell, the open clam is brought down into the material and closed by hydraulic power, filling it as it closes. On clamshell operation, the rig has a 30-in. dumping height advantage over roll-forward bucket dumping. The bucket lifts 11 ft for loading into hauling units.

Also incorporated in the 4-in. rig is a feature incorporated in some of Drott's smaller units—the Hydro-Spring. This is a hydraulic cylinder enclosed in a coil spring and connected to the part of the hydraulic system supplying oil to the lifting side of the main lift cylinders. The unit absorbs rough shock loads usually associated with front-end loaders.

SKID SHOES behind bulldozer blade, act as fulcrum for sizing action.

(*New Products continued on p 206*)

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SURVEYOR READS optical micrometer of DKM-3 to ½ sec, can estimate to 0.05 sec.

Kern Theodolite Splits a Second

First order theodolites are relatively rare birds. But for the limited number of engineers and surveyors who find it necessary to split a second of arc on long sights or star shots, the recently perfected first order Kern DKM-3 is well worth looking over. Built with precise Swiss craftsmanship, the compact, 20 lb instrument reads directly to ½ sec of arc, and splits that hair down to 0.05 sec estimated reading.

It's done with mirrors, a lot of prisms, and Dr. Heinrich Wild's double circle optical reading system incorporating an optical micrometer. Yet the instrument is only about 9 in. high and 9 in. wide.

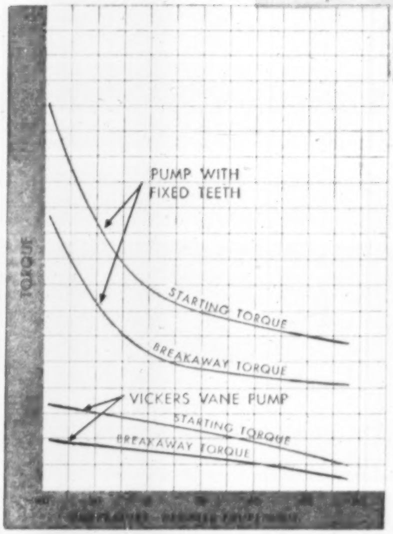
In first order triangulation, the large number of readings required to get a mean figure for closing within 1 sec, and the limit on the magnitude of error for any one sight, puts strict demands on both instruments and personnel. Kern has built the DKM-3 to take as much load as possible off the surveyor and his recorder. The double circle optical reading system eliminates half of the recording job by eliminating the need to take reciprocal readings from the circle. When the optical micrometer is set, the reading is an automatic mean between readings from diametrically opposite sides of the circle.

Certainly the most striking feature of the instrument is the main telescope optical system. It is a modified reflecting telescope, with the main eyepiece mounted outside the supporting trunnions. The arrangement permits full transiting in either direction, since the scope length is less than 6 in. However, the effective optical path through the instrument is 24 in., and the 72 mm objective lens pulls in enough light to provide the brightest image to be found on any theodolite of comparable power today. Interchangeable eyepieces provide a choice of 26 and 45 power for the main scope. To facilitate zeroing in the high power scope, the instrument has a less power-

LOW POWER FINDER scope operating from main eyepiece speeds sighting-in.

MUCH EASIER COLD WEATHER STARTING

Sno-Cat (without body) undergoing tests in extreme cold in the Pyrenees mountains preparatory to being used by French scientific expedition at the South Pole. Sno-Cats will also be used by the U.S. Navy and British Expeditions to the Antarctic.



Curves based on comparative tests of a Vickers Balanced Vane Type Pump and an equal capacity pump with fixed teeth. Oil used in both was SAE 10W premium grade.

Another Reason Why

TUCKER SNO-CATS have

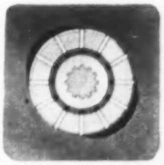
VICKERS® Balanced Vane Pumps

The Sno-Cat operates where it is really cold . . . high in the mountains . . . with U. S. Navy, French and British Expeditions in the bitter wastes of the Antarctic . . . wherever snow is so deep that wheel vehicles fail.

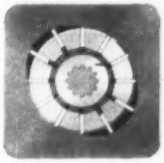
Like many other vehicles that must operate in cold weather, the Sno-Cat uses a Vickers Vane Pump to avoid the extra starting handicap that would be imposed by a hydraulic pump with fixed teeth or spring-extended vanes. In extremely low temperatures such a pump seriously increases starting load over normal (see curves at left) . . . at a time when the cold has substantially reduced the power of the starting battery. The diagrams below at the left show why Vickers Vane Pumps provide much easier cold weather starting.

All Tucker Sno-Cats use a Vickers hydraulic power steering system. In addition to the pump, these systems include a steering booster, a volume control, and overload relief valve.

Any vehicle which must operate in cold weather needs a hydraulic pump that provides "no-load starting". Let us tell you more about it . . . and about the many other reasons for using Vickers Balanced Vane Pumps.



Schematic diagram of Vickers Balanced Vane Type Pump showing how sliding vanes are retracted at normal engine cranking speeds. No oil is pumped and there is practically no starting load.



Similar diagram shows how pump vanes are extended when engine fires. Pumping then begins and continues at all engine speeds (vanes are held in intimate contact with cam ring by system pressure in addition to centrifugal force).

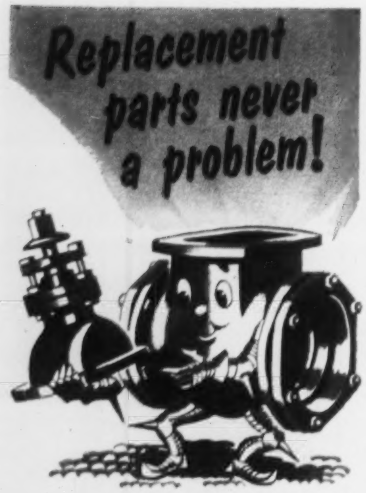
VICKERS INCORPORATED
DIVISION OF SPERRY RAND CORPORATION
1496 OAKMAN BLVD. • DETROIT 32, MICH.

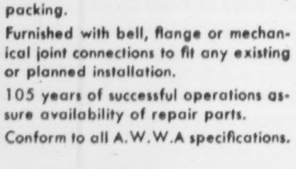
Application Engineering Offices: **• ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES AREA (El Segundo) • MINNEAPOLIS • NEW YORK AREA (Summit, N.J.) • PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) • PORTLAND, ORE. • ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS • TULSA • WASHINGTON • WORCESTER**
IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

Vickers Balanced Vane Type Pumps for mobile equipment are available in five basic sizes having 15 normal delivery ratings and a variety of mountings. Other advantages include: high efficiency, automatic wear compensation, hydraulic balance, dependability and long life. Write for Catalog M-5101.

7376

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921


Replacement parts never a problem!



Backed by more than 100 years of successful operations, Eddy Valve Company has always maintained interchangeability of repair parts. That's one of many reasons why thoughtful, "look-ahead" engineers and purchasing agents specify . . .

EDDY valves

for:

- Extensions and New Installations.
- Installation of New Valves in existing lines.
- Replacement of worn-out valves.
- Shut-off Valves for hydrants.

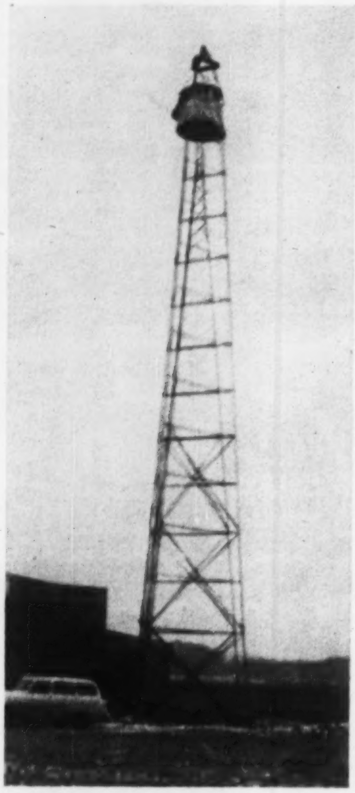
Other reasons are:

- Taper seats provide positive, self-wedging action, assuring no-leak closing.
- Only 3 moving parts.
- Even new employees without special training can service and maintain any Eddy Valve.
- Available with standard or "O"-Ring packing.
- Furnished with bell, flange or mechanical joint connections to fit any existing or planned installation.
- 105 years of successful operations assure availability of repair parts.
- Conform to all A.W.W.A specifications.

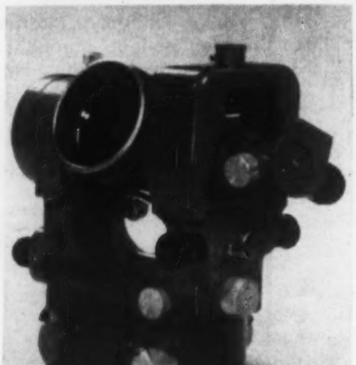
EDDY VALVE COMPANY

A Subsidiary of James B. Clow & Sons

WATERFORD, NEW YORK



TOWERS, such as this 90-ft job, are used for first and second order triangulation.

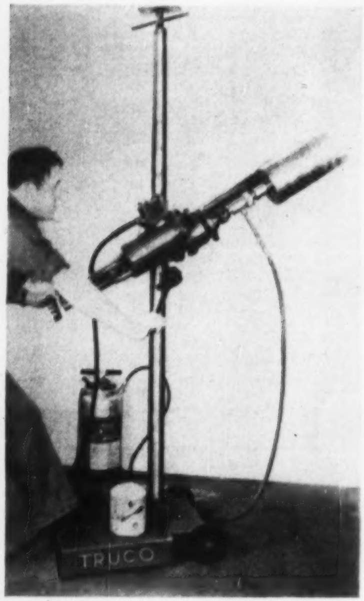


DKM-3 is compact, weighs in at about 25 lb. Short scope has 45 power.

ful view finding scope that feeds into the main eyepiece, utilizing the same cross hair system. A convenient lever on the side of the instrument flips the view from one scope to another instantaneously, so the operator need not take his eye from the instrument when shifting from rough to fine sighting.

The instrument swings freely on oilless ball bearings running on optically flat surfaces, and the horizontal axis bearings are oilless as well, which suits the instrument for extreme cold weather use. Fine levelling is controlled by three knobs at the base of the instrument, which operate levelling cams rather than screw threads. A built in optical plummet speeds precise centering.

The scales are illuminated by daylight or electric lamps. The completely enclosed electrical system for the lamps has a dimming mechanism to adjust brightness, a convenience that prevents blinding during night operations. The circles can be read from two eyepieces, selected by a flip-flop prism, so the operator always can take the reading from the near side of the instrument. Also with this arrangement, it would be perfectly possible for one man to sight the instrument and another, on the other side, to operate the optical micrometer (which does not change the bearing of the instrument) and



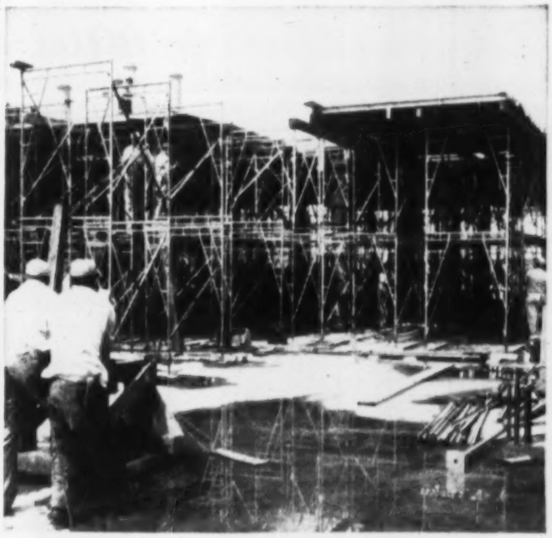
Ceiling Anchors Drilling Tool

A telescoping post that anchors between floor and ceiling or between opposite walls supports a new portable drilling machine designed for use with swivel diamond bits and water swivel units. The Truco machine speeds drilling in cement, concrete or other hard and brittle materials. The motor carriage is moved along the transverse bar by a lever giving the operator the necessary purchase for fast cutting. The telescoping post is mounted in a heavy cast base equipped with two 6-in. rubber wheels. For tight work, a 6-in. square base plate substitutes for the heavier base. Wheel Trueing Co., Detroit, Mich.

(Advertisement)

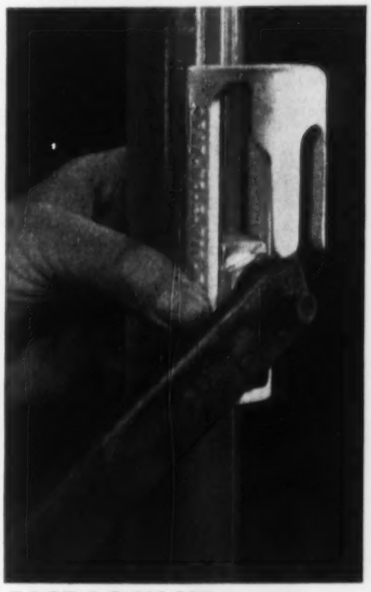
Scaffolding Methods . . . by Patent Scaffolding Co.

END OF THE OLD WORLD—To raze the 13-story Pulitzer building, former home of the old New York World newspaper, more than 3,500 6'6"-high "Trouble Saver"® Sectional Scaffolding frames, spaced 6' apart, were used by Lehigh Salvage Corp. and J. Klotz, Inc. wrecking contractors. Double 8" I-beams, projecting through wall, is the method used to support 89' of the scaffolding adjacent to the busy approach to Brooklyn Bridge.



SLIDING SHORING SYSTEM—Disassembling and reassembling shoring is eliminated by the Wigton-Abbott Corp., Plainfield, N. J., by sliding entire units of the "Trouble Saver" Sectional Shoring on wood sills with a hand winch. Eleven of these shoring units, each covering 720 sq. ft., were slid three times by this method for succeeding concrete pours during construction of the 189' x 231' Monsanto Chemical Co., warehouse, Kearney, N. J.

SUSPENDED FOR BRICK WORK—A 5'-wide working platform is provided for brick masons and materials by "Gold Medal"® Scaffolding Machines while laying up brick veneer on the new 13-story Court House in Tulsa, Okla. Supported by steel I-beams secured to the roof, these suspended machines keep masons at most efficient working level as work advances. Equipped with overhead attachments for planking, the scaffolds also protect workers from falling objects. This scaffolding method was employed by the Manhatten Construction Co., Muskogee, Okla.



FAST LOCK-UP—"Trouble Saver" Scaffolding frames are available for sale or for rental with these fast-acting SlideLoks for joining braces to frames. Wing nuts are eliminated. SlideLoks cut erection and dismantling time and increase safety.

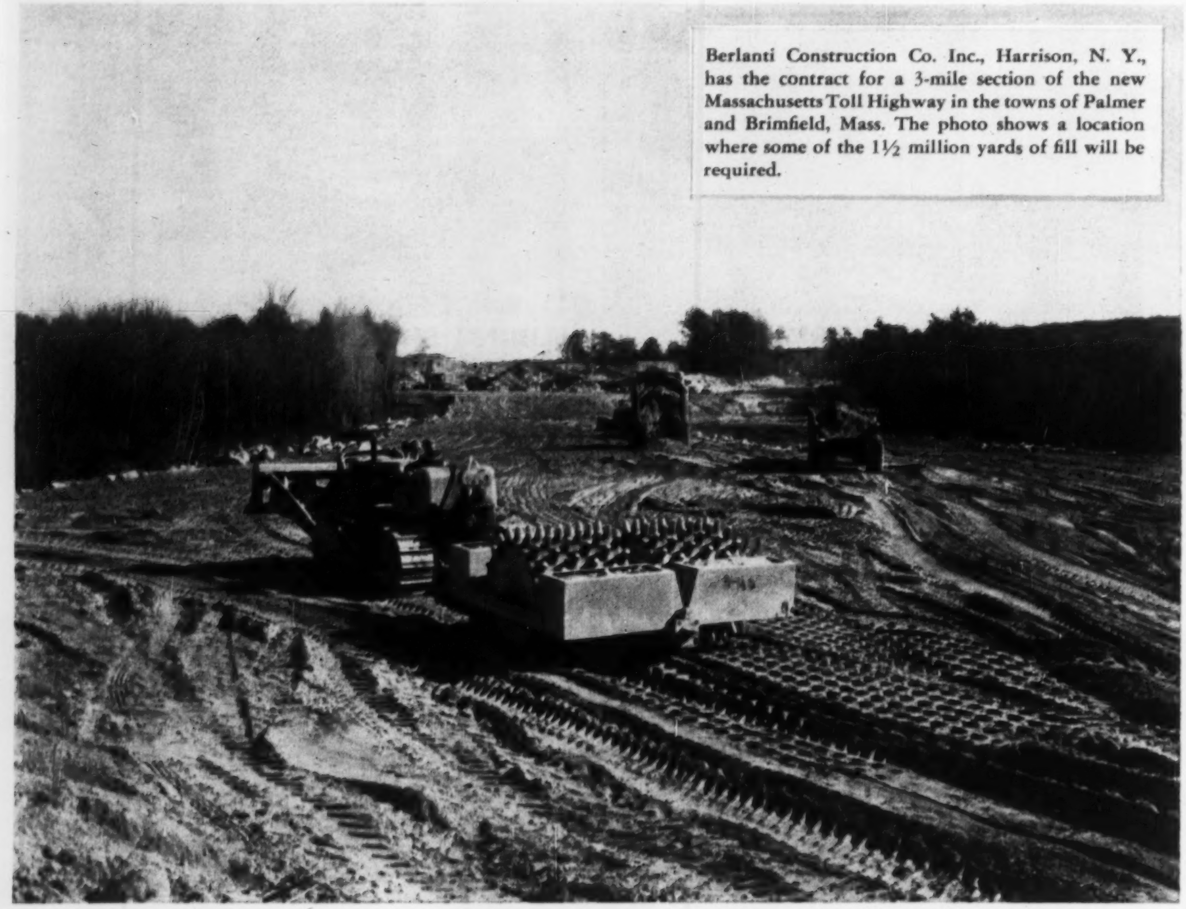
To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that **sells** and **rents** "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. ENR Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
Branches in all principal cities
In Canada: 355 Dufferin St., Toronto

GULF PRODUCTS *and* FINE SERVICE
keep equipment rolling
on Massachusetts Toll Highway Project



Berlanti Construction Co. Inc., Harrison, N. Y., has the contract for a 3-mile section of the new Massachusetts Toll Highway in the towns of Palmer and Brimfield, Mass. The photo shows a location where some of the 1½ million yards of fill will be required.

LIKE other leading contractors, Berlanti Construction Co. Inc., is mighty careful about controllable costs, particularly maintenance expense.

And that's an important reason why the Berlanti people select Gulf as their supplier of petroleum products on every job. They have found that Gulf quality lubricants keep their maintenance costs at rock bottom levels . . . and they appreciate Gulf's prompt delivery service and helpful petroleum engineering counsel.

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Gulf Oil Corporation • Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

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take the readings. Both vertical and horizontal scales are viewed simultaneously in the instrument, and both scales operate with the one optical micrometer, an arrangement that makes possible very rapid star shots.

Accessories for the DKM3 include a striding level and a Horrebow level. For most work, the striding level is superfluous, since the base level is parallel with the horizontal axis of the instrument and is accurate to within 10 sec. A split bubble level is built into one of the trunnion supports and is visible from either side of the instrument.

Kern plans to build about 50 DKM3's per year. The price tag is close to $3,000. Kern Instruments, Inc., 120 Grand St., White Plains, N. Y.

Army's Nine-Ton Crane Is Designed for Air Propping

An airborne crane, capable of lifting more than its own weight, has been developed for the armed services.

The unit, which weighs 14,700 lb, is designed to lift 9 tons at a 10-ft radius with outriggers. Without outriggers, it has a capacity of 7 tons at the same radius. The machine is also equipped with half-yard shovel, dragline, and clam-shell earth moving attachments.

A 40-hp gasoline engine with standardized high mortality parts produced through an extensive engine standardization program at the Engineer Laboratories, power the unit.

Measuring 22½ ft long, 8 ft 2 in.

(*Continued on page 212*)

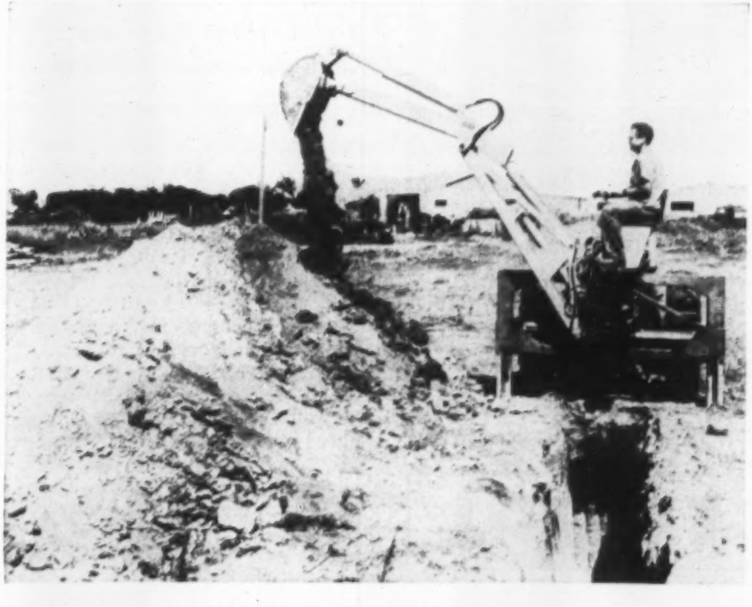
Back Hoe Swivels With Operator

Operators can dig in comfort and always face the bucket on a new back hoe for tractor mounting. The Davis back hoe swings a full 180 degrees, so that it digs to either side of the tractor as well as to the rear. The operator's seat is mounted on the boom support of the hoe unit so that it always faces the work direction.

The swing feature of the back hoe —90 degrees to either side of the tractor axis—makes the unit particularly adaptable for such jobs as cleaning and digging roadside ditches, drainage and irrigation canals, and trenching in crowded areas. The hoe can dump all spoils to one side of the hole, with plenty of room to spare so that the dirt can't fall back in.

Maximum hole depth with the Davis hoe is 13 ft. The unit has hydraulic stabilizer feet on each side of a wide frame, so that the operator can level up the unit on a slope.

The back hoe is mounted on the Davis Loader frame, and uses the same hydraulic pump for power. The unit has quick connectors for its hydraulic system, so that the entire mechanism, seat and all, comes off the tractor in about five minutes. The back hoe is now in production, and is available from Mid Western Industries, Inc., Wichita, Kansas.



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Roly-Door
STEEL SECTIONAL OVERHEAD DOORS

CLEAN, MODERN FUNCTIONAL LINES that blend smoothly with all types of architecture are the hallmark of Morrison Roly-Doors.

SIMPLIFIED DESIGN ensures safe, easy, trouble-free installation and operation . . . manual, electrical and by remote control.

BONDERIZED, ALL-STEEL CONSTRUCTION provides lasting good looks and a durability that defies the weather and years of hard use.

ECONOMICAL INSTALLED COST made possible by sound engineering and precise mass production . . . Morrison Roly-Doors are competitively priced.

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Also manufacturers of MOR-SUN WARM AIR FURNACES AND AIR CONDITIONERS and MORRISON SERVICE BODIES.

IN CANADA: OVERHEAD DOOR SUPPLIERS
1330 Bloor St., W., Toronto 4, Ont.

SNUG TO THE WALL of a railroad underpass is the trench being dug by this compact Cleveland "Baby Digger." Its ability to put the edge of a trench within less than two feet of a parallel wall is but one of this Cleveland's many practical operating advantages.

DIGGING CLEAN AND FAST the same Cleveland "Baby Digger" turned out high daily production on this job. With more than 30 usable digging speeds at the operator's command, the Cleveland cut cleanly through pavement and heavy root growth for trench 22 inches wide by 41 inches deep.

Talk it over with your Cleveland distributor

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio

CLEVELAND

AIR TRANSPORTABLE crane hoists a crawler that outweighs it.

wide and 6 ft 9 in. high, it is within the critical transport limitations imposed by cargo aircraft.

Construction equipment is considered airborne only if transportable as a unit and capable of operations within an hour after delivery. The crane, which will undergo engineering tests, is expected to be air-dropable as well as air-transportable.

The lightweight crane was developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va., and the Wayne Shovel and Crane Division of the American Steel Dredge Company, Fort Wayne, Indiana, now American Steel Dredge Division of American Hoist and Derrick Co.

Prefabricated Chimneys Grow to Commercial Size

A precast insulated stack that has been in use for over a year in residential construction is getting some big brothers. For wider industrial and commercial applications, the Van-Packer precast stack is now made in a range of six sizes from 10 in. i.d. to 24 in. i.d. The stack was previously available only in the 7-in. residential size.

The all fuel refractory stacks are for use with boilers, ovens, retorts and incinerators where flue gas temperatures do not exceed 1,600 F for continuous exposure. The stack is factory produced in sections 3 ft long, of vermiculite concrete insulating wall and an aluminum outer jacket which eliminates maintenance or painting. The sections are cemented one on top of the other with acid-proof, high-temperature joint cement and joints are

This Giant Among Utilities ...Relies on Layne!

In producing 9.4 billion kilowatt hours of electric energy yearly, the generating plants of Philadelphia Electric Company, industrial giant of the Delaware Valley, need 3.25 billion gallons of water—daily. Borrowed from the Delaware and Schuylkill Rivers, this astronomical quantity of water is vital to operation.

Philadelphia Electric, in common with so many other utilities, large and small, relies on Layne for many jobs essential to production, maintenance and safety.

To know all about Layne pumps and their leadership in industry, "ask the man from Layne."

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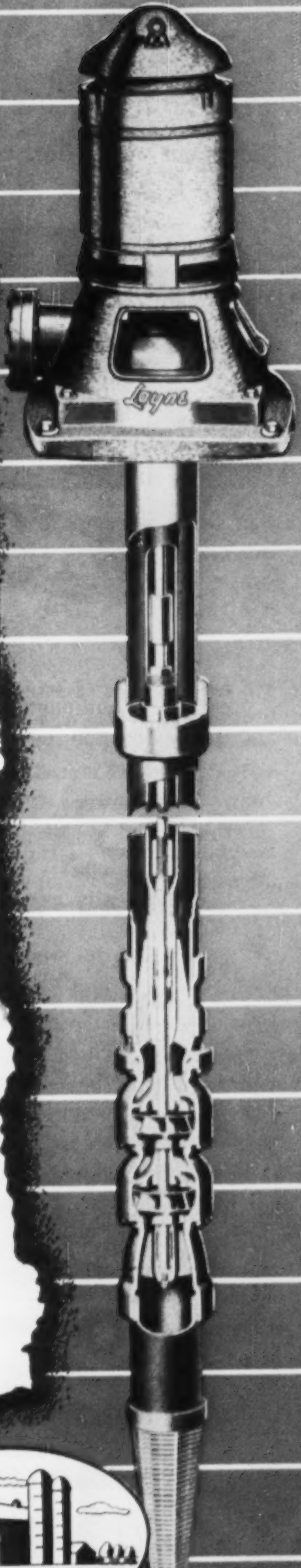

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Industry · Municipality · Agriculture

Water Wells • Vertical Turbine Pumps • Water Treatment

Louisville* "Plays Safe" with TYLOX Jointed

SANITARY DISPOSAL LINES

***PROJECT** — *Trunk sewers for METROPOLITAN SEWER DISTRICT, Louisville, Ky.*

ENGINEER—*Morris Forman, Chief Engineer*

PIPE—*Over 31,000 feet of 60" and 70" reinforced concrete pipe manufactured by Kentucky Concrete Pipe Company, Frankfort, Ky.*

CONTRACTORS—*Ruby Construction Company, Inc., and W. L. Hailey and Company, Inc., Louisville, Ky.*

When engineers and sanitary officials of the Louisville and Jefferson County Metropolitan Sewer District specified TYLOX RUBBER JOINTS for new trunk sewers, they "played safe" on three factors that mean a lot in protecting public funds invested in waste disposal projects. Their TYLOX decision automatically assured:—

No Infiltration — Passage of water **in or out** of the pipe joint is prevented by "compression-tight" Tylox Rubber Gaskets. Tylox Joints help reduce costs of sewage treatment.

No Joint Failures — The rubber of Tylox is specifically compounded to defeat sewerage and industrial waste corrosives. Under ground, and under compression, Tylox outlasts the pipe itself. Tylox helps reduce maintenance costs.

No Installation Delays — Flexible Tylox compensates for pipe angularities in any plane . . . permits wet-trench jointing and immediate backfilling. Tylox helps cut construction costs . . . keeps jobs ahead of schedule with **more pipe laid per day.**

TYLOX is the **one** Pipe Joint which fully meets requirements of engineers, sanitary officials and construction men alike.

MAKING JOINTS WITH TYLOX RUBBER GASKETS IS AS SIMPLE AS

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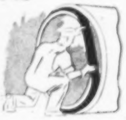
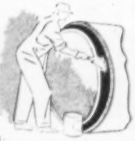


Cement tongue and snap on TYLOX gasket.

B



Lubricate sliding surfaces with TYLOX cement.

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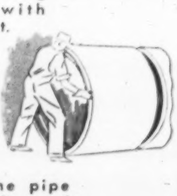

Shove the pipe home to line and grade.

Specify TYLOX RUBBER JOINTS and play safe on your next pipe job. Write for full information and more TYLOX case histories TODAY.

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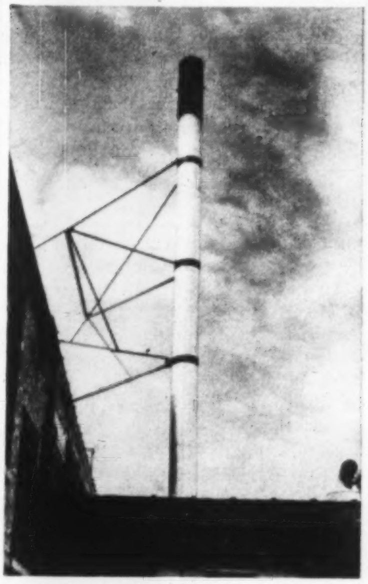

CHIMNEY built of stacked and cemented prefabricated sections.

further sealed with aluminum bands.

The stack, which can be used as an inside or outside chimney, costs, according to manufacturer's estimates, about ⅔ less than comparable brick stacks. Because it is insulated and keeps flue gases hotter, the stack gives better draft than uninsulated steel stacks.

The precast sections will be available through heating and building material jobbers who presently handle the residential chimney. Van Packer Corp., Bettendorf, Iowa.

New Accessory Provides Automatic Lubrication

Trucks and other mobile equipment with standard oil fittings can now have automatic lubrication systems. Stewart Warner is manufacturing the new lubricators, which deliver a measured amount of lubricant to as many as 30 points each time the engine of the equipment is started.

The heart of the lubricator is a vacuum operated pump that is energized each time the ignition is turned on and the engine started. Through a single-line terminating system, the pump feeds lubricant to positive displacement valves located at every bearing.

The metering valves are substituted directly for ⅛ in. PT fittings. Where drive or rivet type fittings are used, a metering valve with a compression type nut and sleeve is fastened to the hydraulic fitting.

Lubricant lines are nylon tubing

KOHLER ENGINES
4-CYCLE • AIR-COOLED

K90..............2.5 to 3.6 H.P.
K160.............3.6 to 6.6 H.P.
K330................7 to 12 H.P.
K660...............12 to 26 H.P.

K90

K160

Modern design, air-cooled Kohler Engines in sizes from 2.5 to 26 H.P. offer a power range to fit all applications requiring a reliable and economical power source.

Kohler branch offices are located in sixteen principal cities. Sales and service distributors, throughout the country, have parts available, are ready to assist you in selecting a Kohler Engine best suited for your requirements. Write for information.

K330

K660

High-voltage magneto insures snappy, all-weather starting. Efficient cooling at all operating temperatures and speeds. Engineered and made by Kohler, internationally known for quality products.

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PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

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Frankfort, Ky.

USF Structural-Plate
BRIDGE FLOORING

UNITED STEEL FABRICATORS,
INCORPORATED
WOOSTER, OHIO

with varnished fiber-glass sleeving to provide additional abrasion resistance. The lines have a burst strength of 2500 psi, well over the feed pressure of 500 psi at the line terminus.

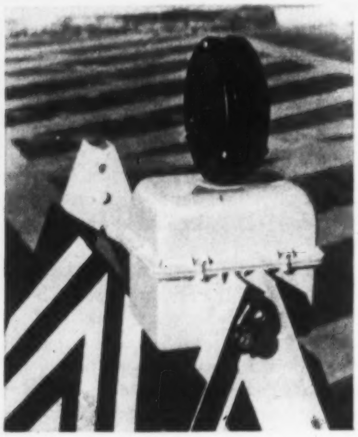
The output of the single stroke pump is sufficient to lubricate 30 bearings on a single system. The positive displacement valves at the lubrication points deliver .003 cu in. of oil or Type O grease each cycle.

An indicating light on the control panel or dashboard of the equipment glows when the system is in operation. Under normal operating conditions, the only attention the Alemite system should require is replenishment of lubricant as indicated at the pump reservoir or by failure of the indicating light to glow when the engine is started. STEWART-WARNER CORP., CHICAGO 14, ILL.

Neon Warning Flasher Has High Intensity Beams

A moisture and weatherproof neon flasher light that throws a high intensity beam in two directions makes use of a new gas discharge tube providing greater brightness. The unit operates from 6-v cells and has a low drain. Batteries last from two to three months in average daily use.

The flasher unit is approximately 7 x 5 x 8 in. in size, and has double Lucite lenses. The light source is shock mounted within a rotating head that is easily positioned. The case of the unit is sealed so there is no danger of ignition of explosive gases. The entire unit is self contained, and double sealed to prevent tampering. A threaded housing on the side permits bolting the unit to barricades, and a keylock bolt is available as an option. GEN-A-MATIC CORP., 14741 BESSEMER ST., VAN NUYS, CALIF.



"Union's T5X Motor Oil... saved time and money here."

"Tippy" and Capt. Jack E. Rozich, tug master, Gerwick-Kiewit, Pt. Richmond, Calif.

GERWICK
KIEWIT

"It's my opinion that you can't give a motor oil any harder task than lubricating workboat engines on a bridge-building project. And I want to report that Union's T5X Motor Oil is working out to our complete satisfaction on the Richmond-San Rafael Bridge construction job.

"Operating our 12 work boats 70 to 80 hours per week as we do means sending them out in all kinds of weather. Yet, even with the strong tides and high winds which prevail in this part of San Francisco Bay, we've been safely getting twice the engine manufacturers' recommended hours between oil changes by using Union's T5X exclusively in all our power plants – Buda, Atlas and GMC. Take it from an old timer in the towboat and construction game since 1910, using Union Oil Products over the years has saved me time and money on many, many jobs, including this one."

If you're not yet using T5X we suggest you find out, as Capt. Rozich did, how this *amazing* purple oil can save time and money for you, too.

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OF CALIFORNIA

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Measure excavators by price per pound of lift capacity

In analyzing shovel operation, you will find that price per pound of lifting capacity on crane rating is also an excellent measurement of excavator value.

Remember, lift capacity is work *capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength, extra speed and stability to handle bigger loads faster with every excavator attachment.

Check Koehring lift ratings shown below — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

Compare for yourself:

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load)		PRICE PER POUND OF LIFT CAP.*
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-ft. radius	?

K831

*Figures available on request—ask your Koehring distributor to see them.

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Do you buy tea or spices originating in some remote mountain fastness? Do you build roads or power plants in "back of beyond"? Do you have branch offices in busy foreign cities? Whatever, wherever your operation, the right insurance protection—*AFIA protection*—can mean the breath of life to your business abroad in event of a serious loss.

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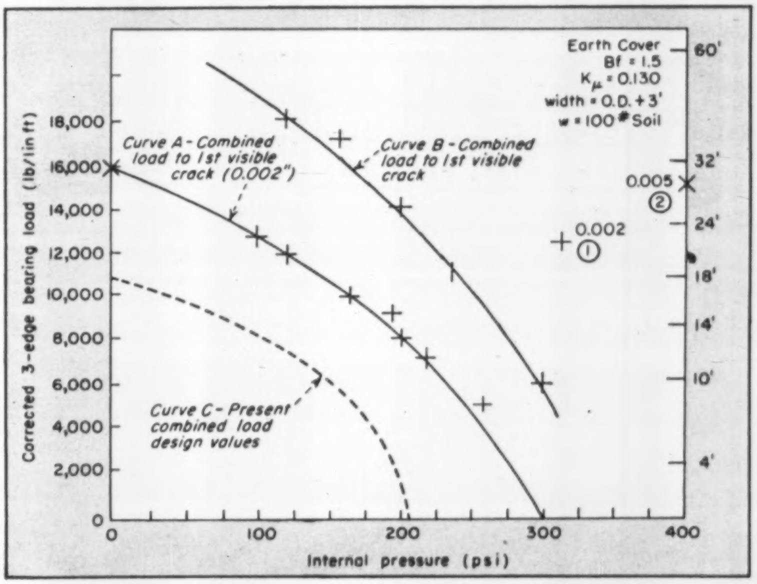
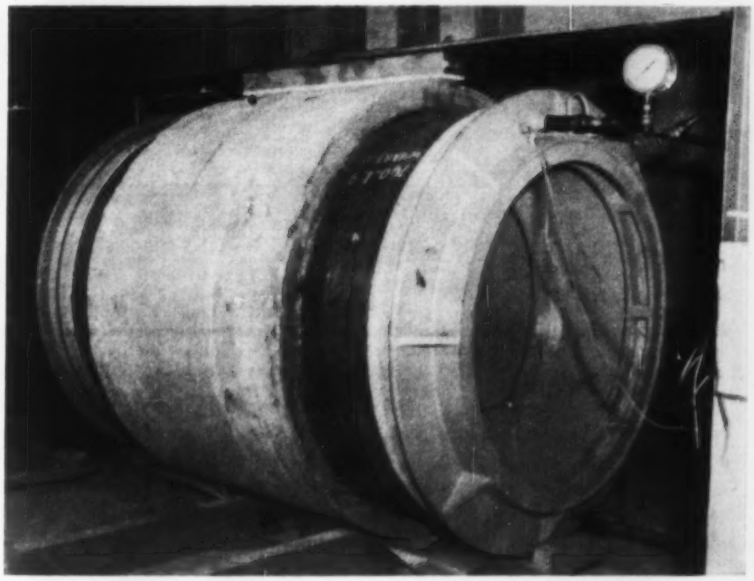
Combined Internal-External Load Tests on Concrete Pipe



TOP TWO CURVES result from combined loading of Class 160 prestressed embedded cylinder pipe to "first visible crack," probable future design condition.



STEEL EXTENSION PIECES on pipe specimen allow combined testing with minimum, and easily corrected for, crushing support from end bulkheads.

Encouraging preliminary results of a new and more realistic lab test for concrete pressure pipe have been released to ENR by the American Concrete Pressure Pipe Assn. By simultaneous testing for internal pressure and external back loads, present combined load design values for prestressed embedded cylinder pipe were found amply conservative. When fully developed the new lab procedure promises data allowing higher loadings when designing all types of concrete pressure pipe.

Class 160 60-in.-dia prestressed concrete embedded cylinder pipe was chosen for the tests. Key to accurate combined testing were 18-in. long thin steel cylinders welded onto each end of the 4-ft long pipe specimens. End bulkheads necessary for hydrostatic testing were clamped to these to minimize support of the specimen itself against crushing. A plot of 3-edge bearing loads against deflection for the pipe only, and then with the extension pieces and bulkhead assembled, yielded correction factors that varied up to 25% for high crushing loads.

Cracking conditions in the concrete, observed internally and externally, controlled test limits. "Incipient cracking" is a microscopic crack .001 in. wide and 12 in. long. The "first visible crack" is defined as .002 in. by 12 in. The critical crack, normally considered in excess of .01 in. wide, is conservatively defined as having a sustained maximum width of .005 in.

The accompanying chart notes significant test results. Most important are curves A and B, plotted (after correction for supporting effect of extensions and conversion from 3-edge bearing loads to feet of earth cover) by testing two specimens under combined hydrostatic and 3-edge bearing loads to create the first visible crack condition. Curve A was obtained by holding external load at fixed values and increasing pressure to crack conditions. Pressure was held and external load increased for Curve B results. Pending exhaustive evaluation, ACPPA people believe that the first visible crack condition will govern design of prestressed concrete pressure pipe.

Curve C is a plot of present allowable loads for the specimen under the conditions indicated. Specimens tested at points along this curve showed no trace of even microscopic cracking. The same result held for test loads 10% greater than Curve C.

The numbered points show results of high combinations of internal and external loads. Point 1 represents a combined load of 2 times both present design loads of Class 160 pipe (12-ft cover) for soil, trench and bedding conditions noted on the chart. A maximum crack width of .002 in. developed, coinciding with the first visible crack condition. Point 2 represents a combined load 2.5 times both design loads. A .005-in. maximum crack occurred, just coinciding with the conservatively assumed critical crack condition, at a test value corresponding with the standard 2.5 safety factor. Off the chart is a third test run at 2.75 times both design loads, yielding a crack .007 in. wide. After all loads were removed, the maximum crack measured only .0005 in.

Simple hydrostatic tests were made on three specimens. Each developed an incipient crack at 250 psi and the first visible crack at 320 psi. Hydrostatic failure occurred at pressures varying between 590 and 620 psi. After failure the pipes held pressures up to 400 psi.

Strain gage readings were taken during all tests, but these and the final interpretation of the tests, will not be available until the latter part of this year. The tests were conceived by ACPPA's committee on Specifications and Technical Problems, chairmanned by H. F. Kennison, chief engineer of the Lock Joint Pipe Co. Kennison supervised the tests at his company's laboratory. The three-day test program was observed by some 13 independent consultants, educators and government representatives, many closely connected with the American Water Works Assn.

Geologists to Test Storm Wave Theory

Maybe freak waves, such as shook the Chicago lakefronts in June 1954 and the Long Island and New Jersey shores in November 1953, can be predicted. At least, three Columbia University geologists think so, and they are out to prove it at the University's Lamont Geological Observatory at Palisades, N. Y.

A three-year project will be conducted to test their theory that several hours warning of storm surges can be given. Their work is under sponsorship of the American Institute of Mining and Metallurgical Engineers and is financed by an Engineering Foundation grant.

The scientists—Maurice Ewing, Frank Press, and William L. Donn—agree on this theory for predicting disastrous waves: "When a line squall, with its accompanying area of high pressure, travels over water at a velocity equal to the normal velocity of a wave of water of the particular existing depth, a resonant effect is produced which can augment the normal wave to disastrous magnitude." They point out that the critical com-

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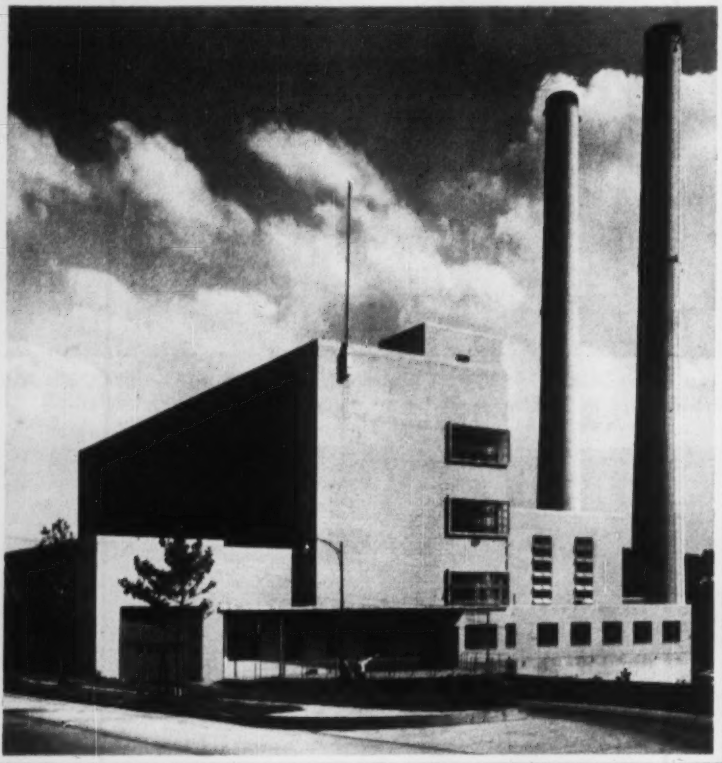

Betts Ave. Destructor Plant, New York City
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This building of the Sanitation Department of New York City is a good example of fine design among commercial and industrial buildings.

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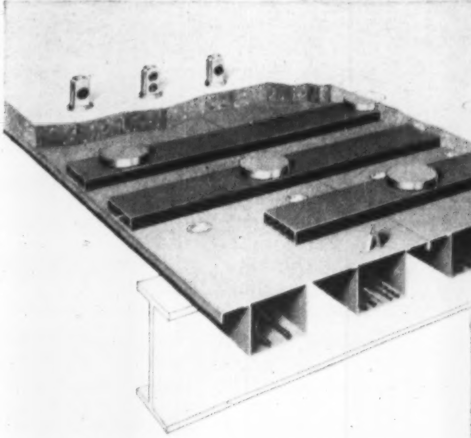
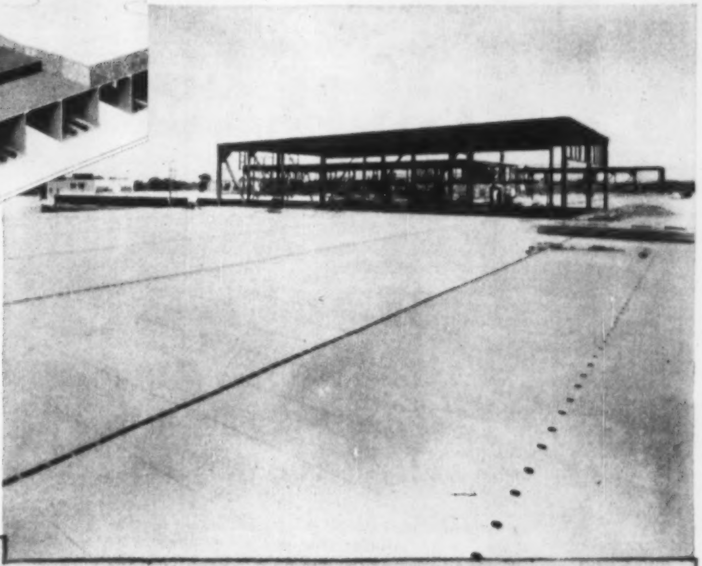


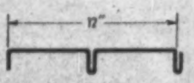
MAHON M-FLOOR

Cellular Steel Structural Sub-Floor constructed with Mahon M-Floor Cel-Beam Section M2. When energized with an electrical distribution system, Cel-Beams are utilized as continuous electrical raceways. In addition, M-Floors have an unusually high strength to weight ratio which, coupled with rapid erection, produces many cumulative and far-reaching economies in both construction time and cost.

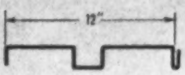


M-Deck Roof Construction. Mahon Long Span M-Deck Sections can be furnished with one, two or three Cel-Beams in various Beam Depths from 1½" to 7½" for Spans up to 32 feet.

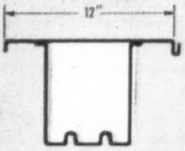
MAHON STEEL DECK and LONG SPAN M-DECK SECTIONS



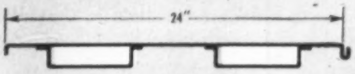
STANDARD DOUBLE RIB



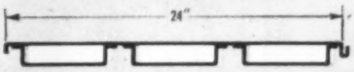
WIDE-FLANGE DOUBLE RIB



LONG SPAN M-DECK SECTION M1-G



LONG SPAN M-DECK SECTION M2-A



LONG SPAN M-DECK SECTION M3-A

New Structural Sections Make Cellular Sub-Floor, Roof, or Combination Roof and Acoustical Ceiling!

Mahon M-Floor Sections and Long Span M-Deck Sections provide designers with a wide range of structural units which have literally dozens of uses in modern construction. In addition to their use in cellular steel structural sub-floors, known as M-Floors, in which the Cel-Beams provide continuous electrical raceways under every square foot of floor surface, these versatile Cel-Beam Sections are used extensively as decking in roof construction. Mahon Long Span M-Deck Sections can be produced with deep Cel-Beam Members to span from truss to truss . . . they can be produced with bottom metal perforated and sound absorbing material inside the Cel-Beams to provide a highly effective acoustical ceiling—in which case, the M-Deck Section serves as the structural unit, the interior finish material and the acoustical treatment all wrapped up in one package. This is the ultimate in economical construction of combination roofs and acoustical ceilings . . . it is permanent, incombustible, indestructable construction which will require no maintenance other than normal decorative painting. For complete information, including engineering data and specifications, see Sweet's 1956 Files, or write for Catalog M-56.

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Manufacturers of M-Floors and Long Span M-Decks; Steel Deck for Roofs, Partitions and Walls; Permanent Concrete Floor Forms; Insulated Metal Walls and Wall Panels; Rolling Steel Doors, Grilles and Underwriters' Labeled Automatic Rolling Steel Fire Doors and Fire Shutters.

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THERE'S A LUBER-FINER MODEL FOR EVERY TYPE OF ENGINE FOR EVERY TYPE OF OIL!

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Luber-finer

PLUS A GENUINE LUBER-FINER PACK

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Model 750-C
Model 200-S
Model 135-S
Model 78
Model 500-C
Models F-155 F-120
Models 272-C 363-C
Models 750-2C 750-3C

MODELS 78, 135-S, 200-S, featuring single-bolt lid, screw-in type pack, and overall compact design for use where space is limited. These Models provide the ultimate in filtration for passenger cars, small trucks and tractors, and other similar engines up to 5-quart, 6-quart, and 7-quart crankcase capacities.

MODELS 272-C and 363-C, featuring the Luber-finer single-bolt lid clamp, O-Ring lid gasket, screw-in type pack, and rugged construction throughout. Designed for heavy-duty service on gas, gasoline or diesel engines up to 3-gallon and 4-gallon crankcase capacities.

MODELS 500-C and 750-C, featuring the Luber-finer single-bolt lid clamp O-Ring lid gasket, large-capacity packs, and extra rugged construction to withstand the most severe service. Designed for use on gas, gasoline or diesel engines up to 5-gallon and 8-gallon crankcase capacities. Also widely used on fuel lines, hydraulic oil systems, and many other industrial applications.

MODELS 750-2C & 750-3C, featuring the Luber-finer single-bolt lid clamp, O-Ring lid gasket, and multiple packs for extra large capacity. Available with either wall or floor mounts for industrial use on engines up to 35-gallon sump, fuel lines up to 15 GPM, hydraulic oil systems up to 450 gals. For larger capacities, two or more Units can be connected in parallel.

MODELS F-120 and F-155, for gasoline and diesel fuel lines on mobile, stationary, or marine applications. Extremely efficient in removing impurities and contaminants from fuel. Single Units will handle flow rates from 0.5 to 1.0 GPM on suction or gravity flow. For larger capacities, connect two or more Units in parallel, or install on pressure-side of fuel pump.

GENUINE LUBER-FINER PACKS available in two types...

DIESELPAK — Expressly designed and recommended for use with all detergent-type compounded oils. Has the abilily to remove the most finely dispersed contaminants without removing or affecting the additives.

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LUBER-FINER, INC. 2514 S. Grand Ave., Los Angeles 7, Calif

bination of atmospheric conditions and wave period rarely occur but the 8-ft wall of water that drowned a number of persons along the Chicago lakefront in 1954 seems to them to have been one of these rare instances.

Weather was clear in Chicago at the time the wave struck. Two hours before it struck there had been a severe squall with winds up to 66 mph. The squall was accompanied by a band of increased air pressure which passed over the city and traveled 40 miles across Lake Michigan, arriving, according to the records, simultaneously with a wave from the northwest. Eighty minutes later the reflected 8-ft wave washed back on the Chicago beaches.

The theory is not entirely new, but this is the first project expected to develop new scientific information to explain the Lake Michigan occurrence as well as the general theory of combined air-water wave build-up. With data from the U. S. Weather Bureau on past storms and surges, trial forecasts of lake surges will be made. Later, investigations of storm surges will be extended to coastal, ocean floods, such as the case studied from Nov. 1953.

Success in their undertaking could presumably mean that several hours advance warning of freak waves could be given. The possible savings in lives and loss of property would be obvious for shore and off-shore activities.

Progress in Particle Boards

A pilot plant for the development of wood particle boards will soon be constructed at the laboratory of Timber Engineering Co., Washington, D. C. TECO is a research affiliate of the National Lumber Manufacturers Association.

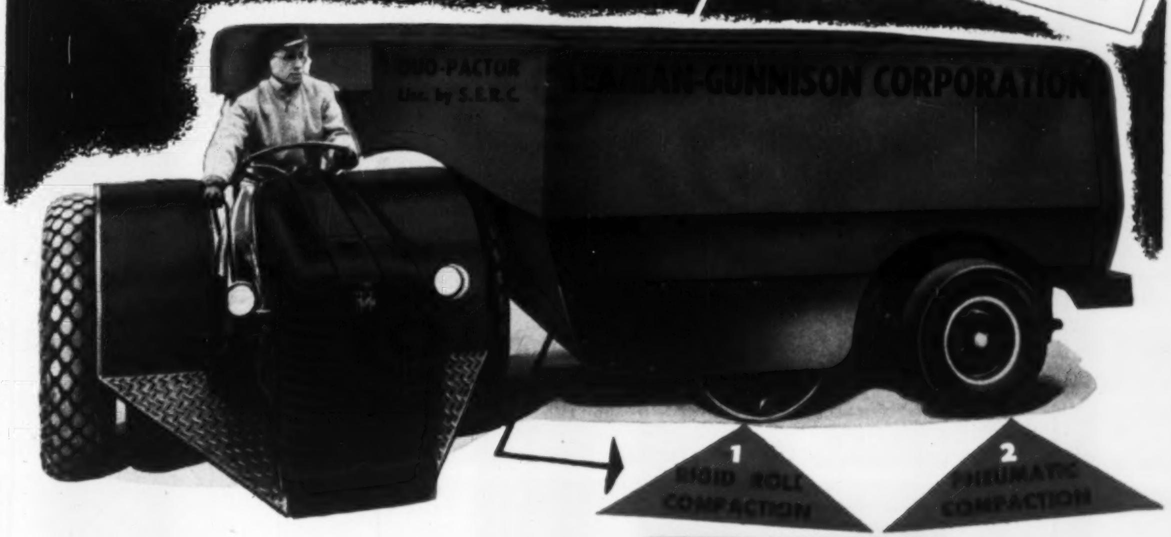
The new facility is a major phase of a $200,000 expansion program now under way at the TECO laboratory. The plant will enable the laboratory to apply European techniques in pioneering the new board. To provide this know-how, two of TECO's top technologists travelled more than 18,000 miles this year in conferring with representatives of over 100 firms and institutions in 11 European countries.

The facility will be equipped to produce many types of particle board from a variety of wood byproducts—branches, slabs, edgings, chips and trimmings. A versatile glue-mixer will turn out proper binders.

There will be an automatic spreader and special hot press to form resin-particle masses into single-layer ho-

New SEAMAN-GUNNISON DUO-PACTOR Handles Both

SEAMAN
. . . an old name in the soil stabilization field introduces:
A new company
Seaman-Gunnison Corporation
A new product
Seaman-Gunnison Duo-Pactor

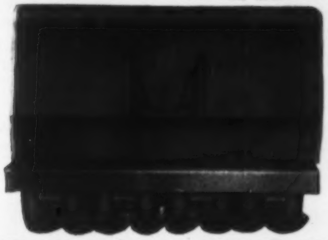


Now, two compaction methods in one machine . . . an advantage found *only* in the Seaman-Gunnison Duo-Pactor. Unit offers pneumatic compaction through eight oscillating, spring-mounted wheels and rigid roll compaction to "iron out" the ridges left by rubber-tired rolling. Operator uses either of the two rollers independently or together . . . hydraulically selective.

In addition, the Duo-Pactor offers these advantages:

- 86 in. pneumatic rolling width; steel roller width 72 in.
- Complete turn-arounds, without backing, on 19-ft roads.
- Widest gross weight range of any roller built . . . 6 to 19 tons, sand and liquid ballasting.
- International "300" prime mover; 4 ft dia. drive wheels for maximum traction.
- Full power hydraulic steering through 180°.

Write today for complete specifications and details.



Spring-mounted oscillating wheels knead road surface.

COMPRESSION in lbs per lineal inch

	Empty	Fully Ballasted
Steel	104	425
Rubber	94	400
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Drive Roll	150	300

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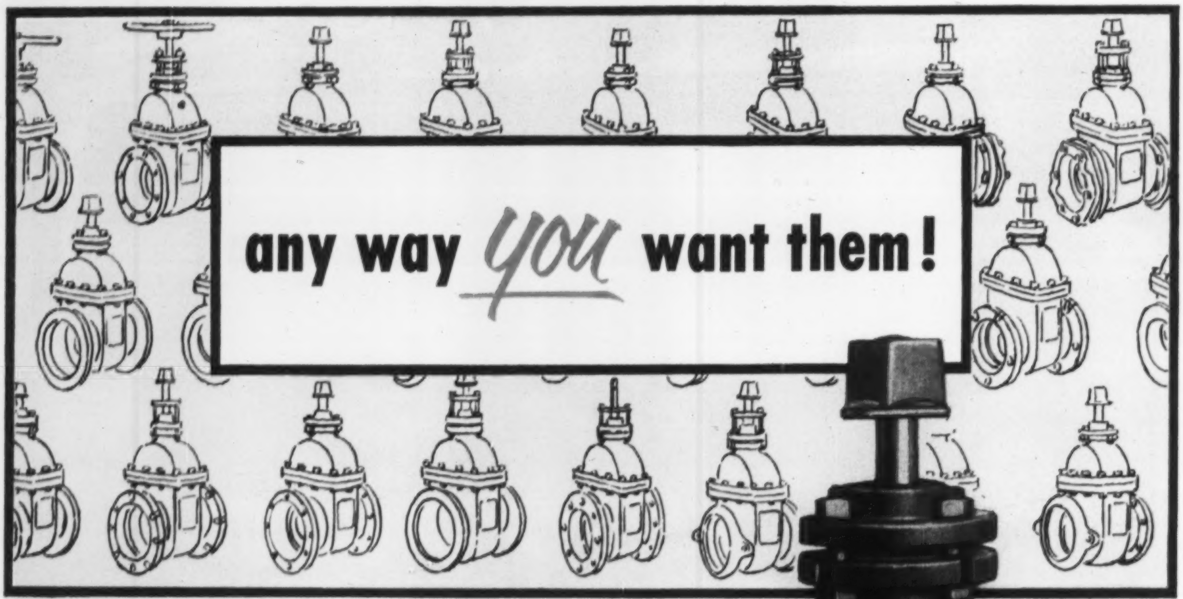
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AWWA
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TEST
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O. S. & Y. or non-rising stem

Outside screw and yoke (O.S.&Y.) or non-rising stem gate valves can be furnished with bevel gears for horizontal installation or spur gears for vertical installation.

"O" ring or conventional stem packing

Two "O" rings, one located above the thrust collar and the other below the thrust collar provide a positive seal against leakage around the stem. The higher the pressure, the greater their sealing force. Lubricant, sealed between "O" rings keeps thrust collar permanently lubricated. Conventional packing is kept tight with packing gland flange adjusting bolts. Valve can be repacked without removing packing gland.

Choice of ends

A wide selection of ends – hub, screwed, flanged, universal, mechanical joint or spigot with many different combinations make the Mueller gate valve adaptable to any main.

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mogenous boards, and sandwich boards. The boards can be produced in dimensions ranging up to 3x6 ft at any desired thickness or density.

French to Build Models of Canadian Seaway Sections

French hydraulic model techniques are to be applied to problems of the St. Lawrence Seaway. A contract has been awarded by the Canadian St. Lawrence Seaway Authority to Neyrpic Canada Ltd., a Canadian subsidiary with offices in Montreal of Neyrpic Laboratorie Dauphinois d'Hydraulique of Grenoble, France.

The contract covers the construction of models—and their testing—of Montreal Harbor and of the Lachine Rapids section of the Seaway. A special building to house the hydraulic models will be built at Ville Lasalle, near Montreal and close to the shore of Lachine Rapids.

Two models will be built. One will reproduce the part of the St. Lawrence River from Dorval to Heron Island, a 9-mile stretch; the other will represent that part of the river from near Heron Island to below the harbor of Montreal. Each will be constructed to a scale of 1 ft to 200 ft horizontally; 1 to 125 ft vertically. The Seaway Authority has previously had model tests conducted in the National Research Council laboratories at Ottawa.

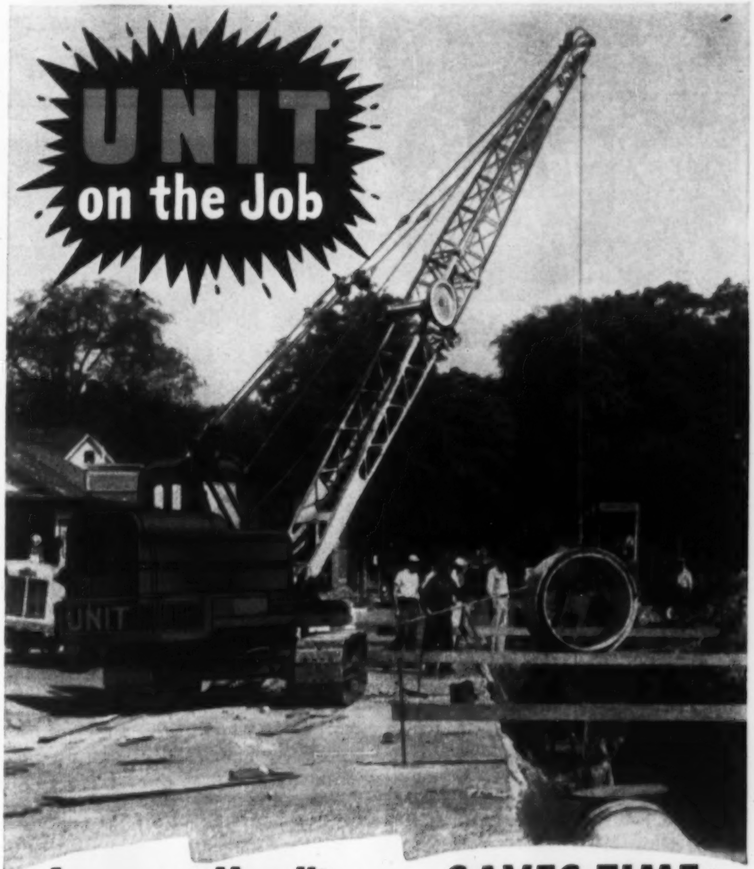
New Lab Probes Mortars

Concrete block in particular, and mortar in general, is to get a real looking into at the University of Toledo's (Toledo, O.) new concrete masonry research laboratory.

Prof. Edward L. Saxer, head of the department of civil engineering at the university and director of concrete masonry research at the Toledo Research Foundation has outlined an extensive program to be undertaken at a new 40x80-ft, $40,000 laboratory.

A major weakness in present concrete blocks, of which 2 billion are used annually in the U. S., is the mortar that holds the blocks together. Properties of mortars that will be investigated include: comparative strengths, adhesive qualities, imperviousness to water, resistance to weathering, and shrinkage. Experiments will be run on aggregates, additives and surface coatings.

The research will be done on an annual budget of $25,000. It is sponsored by the National Masonry Association, the Expanded Shale Institute, and twelve manufacturing companies.



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This sturdy UNIT Crawler Crane offers plenty of power plus accurate control. Spots heavy sewer pipe perfectly into the desired position. Adjustable Hook Rollers, Extra Long Crawlers and Wide Multiple Hinged Crawler Shoes provide all-around stability. Full Circle Swing, controlled from within UNIT'S FULL VISION CAB, provides safe and efficient operation. The operator has a complete view of the entire job at all times. GET THE FACTS! Investigate this modern UNIT and its many features. Write today for literature.

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½ or ¾ YARD EXCAVATORS . . . CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

SHOVEL
DRAG
CLAM
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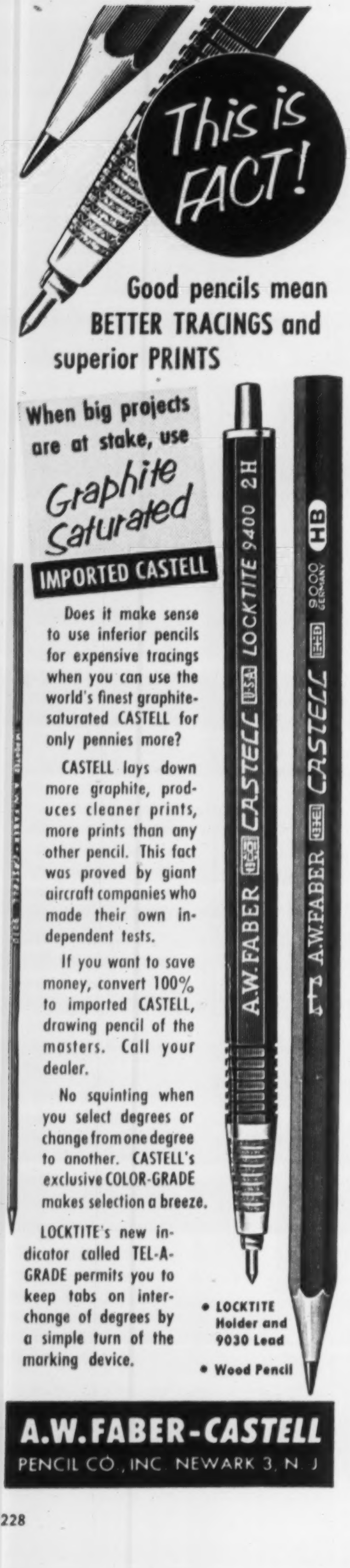
All Models Convertible to ALL Attachments!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C. D. Haxby

Haxby Is Named President Of National Constructors

C. D. Haxby, vice president of The Rust Engineering Company, Pittsburgh, Pa., has been elected president of the National Constructors Association.

The NCA is an organization composed of leading engineering and building firms engaged in design and construction of petroleum refineries, steel mills, chemical plants, power plants and other industrial facilities.

As president of NCA, Haxby succeeds T. C. Williams, president of Stone & Webster Engineering Corporation, New York.

Bryon E. Clark Assigned to 13th Coast Guard District

Byron E. Clark, who has been a civil engineer with the Corps of Engineers for 17 years, last month became chief assistant to the officer in charge of the civil engineering section in the 13th Coast Guard District Office in Seattle. He succeeds Paul N. Bickford, who has retired.

Clark has been a special assistant in the Engineering Division of the Corps of Engineers Office at Seattle, working primarily on the original planning and programming for Eagle Gorge Dam, now in the preliminary construction stage.

Utah Construction Co. Promotes Three Officers

E. W. Littlefield of San Francisco has been named executive vice president of Utah Construction Company, world-wide mining and contracting firm in Salt Lake City, Utah. At the same time, C. S. Davis and Frank M. Keller were elected general vice presidents.

The new executive vice president will continue to serve as secretary, treasurer and director. A graduate of Stanford University and a veteran of World War II, he joined the company in 1951 as vice president and treasurer.

During the last several years, Davis has been concerned largely with heavy construction and Keller with light construction. Both have been serving as vice presidents.

F. A. Fairbrother Retires From Albert Kahn Firm

Frederic A. Fairbrother, vice president and chief architect with Albert Kahn Associated Architects and Engineers of Detroit, has retired.

A graduate of the University of Pennsylvania School of Architecture, Fairbrother has been with the Detroit firm for 40 years.

He spent the early part of his carerr in eastern architectural offices and joined the Ford Motor Company in 1913. When Henry Ford turned to

B. J. Lucarelli

Heads State Association

Benjamin J. Lucarelli of Jersey City has been elected president of the Building Contractors Association of New Jersey.

Head of the B. J. Lucarelli Co., Inc., Lucarelli was recently named a member of the newly-formed Joint Labor-Management Committee for the construction industry in New Jersey (ENR, Jan. 12, p. 87).

F. A. Fairbrother

Albert Kahn for architectural service in 1915, Fairbrother joined the Kahn organization where he remained until his retirement.

Fairbrother was made an associate in 1940 at the time Albert Kahn changed the corporate structure of the firm he founded in an effort to assure its perpetuity. Early in 1945 Fairbrother was appointed chief architect and thereafter was made vice president.

Stone & Webster Names Three Vice Presidents

Stone & Webster Engineering Corporation announced the election of Edward J. Ford, Harold J. Sykes and Edwin H. Krieg as vice presidents.

Ford, senior construction manager in the New York office, and Sykes, a construction manager in the Boston office, will continue to assume their present responsibilities for a number of power and industrial projects throughout the world.

Krieg, recently transferred to the New York office, will continue his activities as a consulting engineer and will devote his attention to the corporation's interests in steam power and related fields.

Fluor Corporation Appoints Power Plant Design Manager

The Fluor Corporation, Ltd., Los Angeles, Calif., has appointed M. S. Umbenhauer to the newly-created post of manager of power plant design.

Umbenhauer, who will direct the company's technical services to the electric power industry, brings to Fluor more than 25 years of engineering and administrative experience in the field of designing and building power plants. Companies with which he has been associated previously include Burns and Roe, Inc., Armstrong Engineering Company and Lion Chemical Corporation.

Royal Davenport Retires From Geological Survey

Royal W. Davenport has retired as chief of the Technical Coordination Branch of the Water Resources Division, Geological Survey, after 45 years of government service.

A civil engineering graduate of Worcester Polytechnic Institute, Davenport was first appointed to the Water Resources Division in 1910. He has served with it continuously, although from 1920 to 1928 he was assigned to the Federal Power Commission to carry out power studies necessary to administration of the Federal Power Act.

His career embraces a number of water resources investigations, and power and water utilization studies in Alaska, the Columbia and Great Basins and in Washington, D. C. In addition, Davenport has served as special advisor to government officials on technical phases of the national program of the Water Resources Division as well as on water resources apportionment and development problems along the Canadian boundary.

Consultant Is Appointed For Oakland Airport Work

The Oakland (Calif.) Board of Port Commissioners has appointed Russell S. Harris as a consultant for the next phase of its $11.5-million expansion of Metropolitan Oakland International Airport.

Harris, now retired, was vice president and general manager of the American Dredging Company, which filled in a section of the airport on which a runway was built during World War II.

Harris' present work with the Port Commissioners will relate to the dredge-filling of submerged lands on which the new 8,600-ft runway and terminal building will be built. It is estimated that the project, for which the contract will be let before the end of the fiscal year, will require the dredging of 14,000,000 cu yds of fill from the Bay.

(*Men & Jobs, continued on page 230*)

Are You All Wet...

...Below Grade?

BEFORE YOUR MASONRY *WEEPS*..

USE

"EASY ONE COAT"

TO KEEP IT CLEAN AND DRY

If your below-grade masonry is inclined to be damp, paint it *now* . . . don't wait for water seepage and freezing to bring on cracks and crumbling!

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Engineer Shortage

Highway commission asks scholarship program

The North Carolina Highway Commission and Highway Chairman A. H. Graham have proposed creation of a state scholarship fund to help recruit young engineers. They've also urged an upward revision of salaries for highway engineers and other personnel.

Action came after Commissioner Harry Buchanan of Hendersonville said five graduate engineers had left highway jobs in his division. He predicted that if something isn't done, the state won't be able to carry out an expanded highway program even if federal-aid funds are obtained from Congress.

Under the scholarship proposal, soon to be laid before a special committee named by Governor Luther Hodges to study needs of the highway division, financial assistance would be given to engineering school students who would agree to join the highway department following graduation.

Loss of engineers and a shortage of replacements were reported elsewhere in the state.

The problem, which is becoming one of national concern, was recently discussed at the Second General Assembly of Engineers Joint Council in New York (ENR, Feb. 2, p. 23). One of the EJC suggestions was that greater use be made of engineering technicians as a means of supplementing the available supply of engineers.

Future Engineers

Michigan's JETS program spurs student interest

Michigan State University has announced that the JETS program which it originated in 1950 is making a definite contribution to the national effort of increasing the supply of engineers.

Known as Junior Engineering Training for Schools, the organization is the "4-H club of engineering." Started in East Lansing, Mich., five years ago, the program now includes 75 clubs in 18 states, with an active membership of more than 2,000 boys and girls of high school age. The aim of the JETS, whose headquarters are at Michigan State, is to stimulate interest in engineering and at the same time to discourage engineering as a career for those whose talents lie in other areas.

Broad in scope, the program attempts to give club members an accurate picture of engineering and the opportunities it offers through club projects, films, talks with professional engineers and a club newsletter known as "JETS-O-GRAM". A four-year scholarship at Michigan State is awarded each year to the outstanding student in each club and additional interest is stimulated through an annual project competition that is conducted at the university's Engineering Exposition.

In commenting on the origin of the program, Harold P. Skamser, JETS director, said that "the word about engineering was just not getting through to the majority of students in high school who are interested in engineering. . . . We feel that in the JETS program high school students can learn at first-hand the real nature of engineering and be able to compare their talents and abilities with the requirements of the profession."

Sponsors of the program have expressed the hope that the JETS program will be a definite boost to America's race with Russia for trained engineers.

Ehlers Receives Commission In Public Health Service

The Public Health Service, U.S. Department of Health, Education and Welfare, has commissioned Joseph H. Ehlers a sanitary engineer director in its commissioned reserve.

Former field representative of the American Society of Civil Engineers, Ehlers was appointed Assistant Commissioner for Technical Services, Urban Renewal Administration, last year (ENR, Dec. 29, 1955, p. 74).

He has been active for many years in professional societies and construction industry groups and has had a number of consulting engineering assignments in the field of public works in Japan and China.

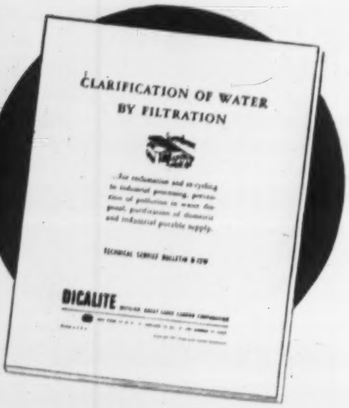
Washington State Names J. M. Haley to Water Board

The Washington State Department of Public Works has announced the promotion of John M. Haley to principal hydraulic engineer in the Division of Water Resources.

Haley will be in charge of a statewide water resources investigation for the State Water Resources Board. The board is responsible for all activities in connection with planning for conservation, control, and utilization of the water resources of the state.

He replaces William L. Berry, who was recently named assistant state engineer.

(*Men and Jobs continued on page 232*)



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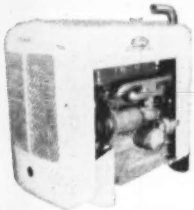
"FORD POWER STARTS QUICKLY

hangs on to heavy loads — doesn't hesitate a bit!"

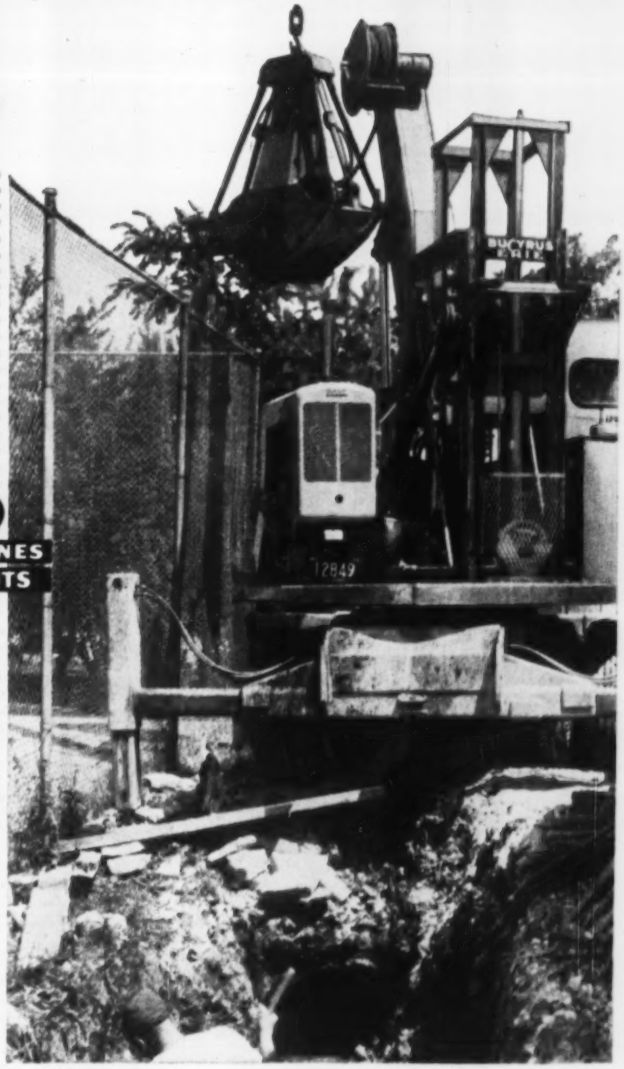
says FREDERICK VOLK, Fox Point, Wis.

"We handled approximately 60 cubic yards in close quarters with the clam shell in about three hours work. We were digging a drainage trench for a 42" culvert and had to go around various obstacles including trees and a 12-ft. fence to swing the clam over with the load. I like the Ford power of this Hydrocrane because it starts quickly—hangs on to heavy loads and it doesn't hesitate a bit!"



Ford

INDUSTRIAL ENGINES
AND POWER UNITS



The Bucyrus-Erie Model H 3 Hydrocrane that Mr. Volk operates for the village of Fox Point is powered by a Ford "172" industrial engine. Built for versatility, mobility and economy, the Hydrocrane gives precision control through a hydraulically operated closing bucket and a variety of attachments. Upper deck revolves 360° with telescoping high-lift boom capable of from 30- to 38-ft. full load length. Hoist rams provide free line speed of up to 190 f.p.m. with 6,000 lbs. line pull. Ford Industrial Engines can provide similar power plants for all the major types of construction equipment.

It will pay you to specify Ford engines on your next piece of equipment because Ford is the only industrial engine manufacturer to offer modern Short Stroke design in a *full line* of overhead-valve 4-, 6- and 8-cylinder engines. These engines cut piston travel and piston speed which reduce friction and wear. The result is more usable power and extended engine life. This means you get jobs done quicker and more economically.

Right down the line . . . from the 134- and 172-cu. in. 4-cylinder engines . . . to the powerful 6-cylinder 223-cu. in. engine . . . and the big heavy-duty V-8's of 272 and 332 cu. in. displacement, you'll find Ford engines are years ahead in engineering. Engines that are designed to give power-packed performance more economically and for a longer period of time.

Autothermic pistons help maintain proper piston-to-wall clearance and prolong engine life.

Large overhead valves of high chrome-nickel alloy improve volumetric efficiency, resist warping.

Free-turn intake and exhaust valves reduce the possibility of valves sticking, help maintain compression longer.

Iron Alloy sleeves are centrifugally cast for better heat transfer and wear characteristics plus longer cylinder wall life.

FORD "172"

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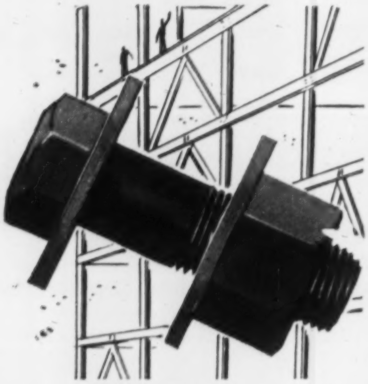
Because . . .

NO BOLT is ANY BETTER THAN ITS WASHERS



It pays to Specify **MIL-CARB*** CARBURIZED **WASHERS**

*TRADE MARK

for STRUCTURAL STEEL FRAMING

Today the swing in field assembly of structural steel joints is definitely toward *High Strength Bolting.* According to competent authorities who have had practical experience with this form of construction and evaluated its benefits, it is possible to *build better* and *build faster* by employing this method of joining steel members.

A primary essential, of course, is to use heat-treated, quenched and tempered bolts to produce a minimum ultimate strength of 120,000 psi for the usual size of bolt. At the same time, nuts must meet a proof load equivalent to the ultimate load of the bolts . . . *and the washers must be hardened, special quality steel.*

And because no bolt assembly is any better than its washers, consistent high-strength bolting should include the use of MIL-CARB Carburized Washers.

MIL-CARB Carburized Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, which insures uniform quality control, always equal to the rigid specifications for this form of steel assembly (ASTM Designation A325, applying to bolts, nuts and washers).

Additionally, MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.

For uniformly sound construction specify MIL-CARB Carburized Washers

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T. J. Gutt

Concrete Specialist Joins George Rackle & Sons Co.

The George Rackle & Sons Company, Cleveland structural concrete manufacturer, has appointed Tadius J. Gutt as assistant to the president. Gutt was formerly general manager of the Texas Stressed Concrete Corporation of Austin.

A graduate of the University of Rochester, Gutt participated in the design and building of the Walnut Lane Bridge in Philadelphia and the Arroyo Seco Bridge in Los Angeles, the first two pre-stressed bridges in the nation, and has served as a consultant to the Atomic Energy Commission.

He will assist the Rackle firm in extending the use of pre-stressed structural forms throughout the Great Lakes area.

State Highway Department Presents Award to Waller

H. Fred Waller, Jr., supervisor of the bituminous research laboratory of the North Carolina Highway Department, Raleigh, N. C. was presented the Highway Commission's annual D. B. McCary Award for outstanding service during 1955.

The award was presented to Waller for work carried out on bituminous mixes.

In the form of a plaque, it goes each year to the highway employe who in the opinion of a committee of fellow employes, makes the year's most outstanding contribution to the highway program.

(*Men and Jobs continued on p 234*)

NOW... USE
KAYLO-20
TO 1800° F.

Letters cut from new Kaylo-20 dramatically demonstrate ease of on-the-job fabrication

New pink insulation boosts Kaylo temperature range 600°F.!

Kaylo®—king of high-temperature insulations—adds a new jewel to its crown . . . a complete line of *pink* Kaylo-*20* insulation serving the extremely high-temperature ranges from 1200°F. to 1800°F.! New Kaylo-*20* is designed for all extra-high temperature applications including catalytic cracking units, refractory wall backing for furnaces and boilers, and fireproofing of piping, equipment, and vessel skirts.

For the first time, Kaylo-*20* brings to these high-temperature installations all the qualities that made regular Kaylo famous—*stability* (Kaylo-*20* will not disintegrate even in boiling water) . . . *ease of application* (cut, saw or score it on the job with ordinary hand tools) . . . *light weight* (only 11 pounds per cubic foot) . . . *economy* (remove it for line inspection, replace it without waste). Kaylo-*20* shrinkage at top temperatures runs less than 2%!

New Kaylo-*20*—now available in a complete range of thicknesses for iron pipe and copper tubing sizes from ⅛" to 39", and in blocks and beveled lags up to 18" x 36" x 3" thick—is distributed by Owens-Corning Fiberglas Corporation. With the other Fiberglas* industrial insulations, Kaylo-*20* completes the most versatile family of plant insulations available. See *Sweet's File, Chemical Engineering Catalog*, or *Refinery Catalog*. Or write: Owens-Corning Fiberglas Corporation, Dept. 145 B-16, Toledo 1, Ohio.

KAYLO and FIBERGLAS—from one reliable supplier—now provide complete insulation coverage from lowest sub-zero to 1800°F.

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Save Up To 50%

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HYDRAULIC TRUCK LOADER

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- 3,000 lb. capacity
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The LoDaL hydraulic truck loader can load itself and other trucks as well. Loads the heaviest types of material in just a few minutes. On short haul and scattered yardage operations, the LoDaL will outperform other types of machines. Unmatched economy with ONE MAN and ONE MACHINE . . . for such jobs as loading sand or gravel, street repairs, sweeper pickup, rubbish collection, leaf loading, coal handling, cinder removal, snow removal . . . and many other daily tasks.

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Inter-City Group To Seek A Joint Source of Water

Victor B. Higgins, Greensboro, N. C., city councilman and a retired civil engineer and contractor, has been elected chairman of a North Carolina inter-city committee which is seeking to develop a joint source of water supply for seven cities.

Higgins and the members of his committee will examine engineering proposals and recommend who should be retained to make a preliminary survey for the project, which one engineer has estimated will cost $18 million.

The seven cities represented are: Thomasville, High Point, Greensboro, Burlington, Kernersville, Lexington and Winston-Salem. Members of the committee include mayors, city managers, city attorneys, city engineers, utility department heads and finance chairmen from seven cities.

The three engineering firms, asked by the committee to make a combined bid on handling a survey to determine area water needs are: Hazen and Sawyer of New York, Piatt and Davis of Durham, N. C., and W. C. Olsen and Associates of Raleigh.

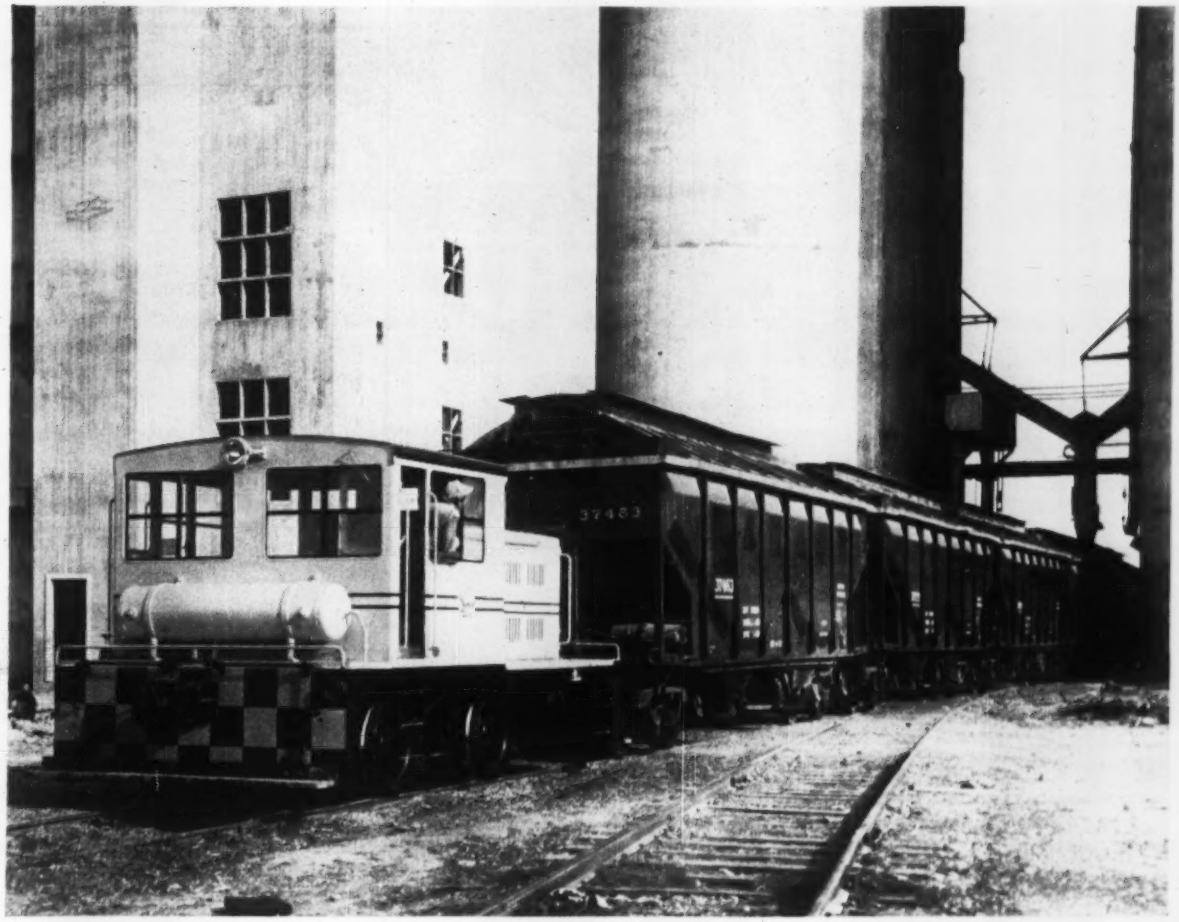
Men and Jobs Briefs . . .

• **Associations–L. G. Hardy** of Billings, Mont. is elected president of the Building Chapter and **Frank Fly** of Miles City, Mont. is named to head the Highway and Heavy Construction Chapter of the Montana units of A.G.C. . . . The Society of Municipal Engineers of the City of New York names **Steward I. Sherman,** senior civil engineer in the office of the chief engineer, Board of Estimate, as president.

J. W. Caum and **L. C. Gilbert** are designated senior assistant technical secretaries by the American Society for Testing Materials . . . **Edward T. Sullivan** of Louisville, Ky. is elected president of the Louisville Chapter of A.G.C. and **Arthur G. Tafel** is named president of the West Kentucky Chapter of the A.I.A.

• **Corps of Engineers–Lt. Col. Herschel E.** is appointed area engineer at Denver, Colo. He succeeds **Lt. Col. Robert W. Dalrymple** who is assigned to Washington, D. C. . . . **Roger C. Albiston** is named engineer in charge of the Providence R. I., field office of the Corps' hurricane survey unit. He succeeds **Samuel P. Allen,** who is reassigned to work on hurricane protection along the Connecticut shore.

(*Continued on page 236*)



Anderson Elevator Company, Maumee, Ohio, reports:

Profits are Fatter since Plymouth cut Handling Costs

"We handle more cars than ever before with our 35-ton Plymouth," says Superintendent Don Bullis. "Plymouth's economy in switching cars for loading, unloading and spotting under the spouts has resulted in big time and money savings.

"Top performance in handling cars one at a time or in strings of forty-five is just part of the story. We've cut time, labor and maintenance costs, and even in hardest use the Plymouth burns only two gallons of fuel per hour. Anderson profits are fatter since Plymouth cut the handling costs."

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Fatten your profits by cutting hauling and handling costs. There's a Plymouth for every job —Models from 3 to 70 tons . . . Gasoline or Diesel, mechanical or Torqomotive Drive.* Also Diesel-Electrics. Write today for free catalog to PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-4, Plymouth, Ohio.

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TORQOMOTIVES

* TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

MAINTAINS Torque CAPACITY As Friction Material Wears

Lipe Constant-Capacity CLUTCH

As long as there's any amount of wearing surface left on the friction material, Lipe's Constant-Capacity Clutch never loses its torque capacity.

The reason? Automatic compensation for friction material wear through a unique application of the toggle lever principle. The toggles never go over center. As friction material is dissipated, their constantly increasing leverage builds up pressure in almost direct ratio to the losses sustained.

Arrangement and location of the toggles assure a uniform pressure application pattern. Every square inch of facing area engages simultaneously and in absolute parallelism. Creation of highly concentrated heat areas to cause spot burning is prevented.

More Long-Service Features

Soft Engagement—because the toggles absorb the initial energy of the springs . . . and because the speed of the toggle action fades as the pressure plate approaches the friction element.

High Thermal Efficiency—because the massive plate, ribbed for rapid radiation, is cooled by positively generated air currents.

No Servicing—because these self-compensating, non-adjustable clutches insure automatic internal adjustment throughout the life of the clutch facings.

Now in quantity production. Write for specifications and performance data.

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Manufacturers of Automotive Clutches and Machine Tools
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. . . Men and Jobs

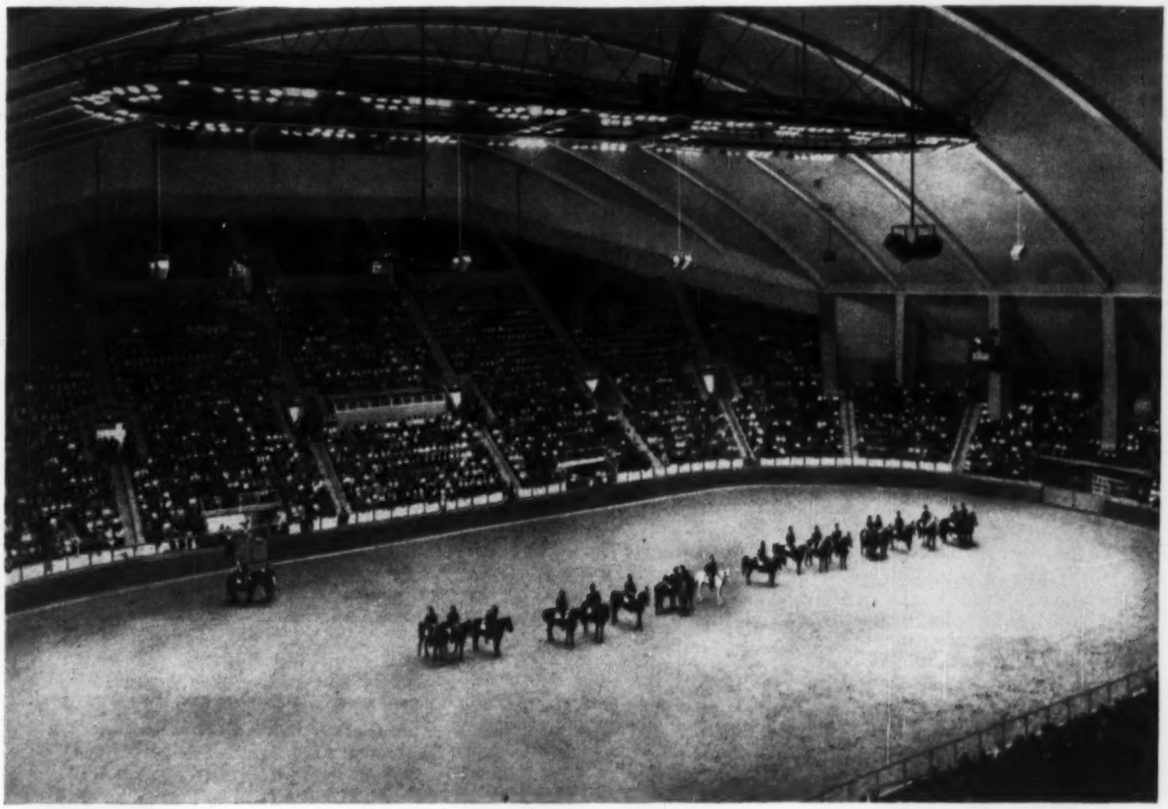
• **Careers**—The Washington State Highway Department appoints **Richard Barber**, formerly Wenatchee district engineer, to the headquarters office at Olympia as office engineer. **Walter E. McKibben**, assistant construction engineer at Olympia, is transferred to Wenatchee as district engineer . . . **Eugene L. Simm**, associate engineer with Wilbur Smith and Associates, New Haven, Conn., is appointed city traffic engineer for Harrisburg, Pa.

• **Business**—The Wailaka Construction Co., Inc., of New York, appoints **Arthur Comstock**, formerly of Walsh Construction Co., as chief estimator . . . **J. Floyd Beaver** of Charlotte, N. C., chief engineer, maintenance of way and structures of the Southern Railway is appointed assistant chief engineer of the railroad system with headquarters in Washington, D. C. . . **Fred J. Lauer**, executive vice president and general manager of A. Bentley & Sons Co., Toledo, Ohio, general contractors and **James H. Bruere**, vice president and general superintendent, are elected to the company's board of directors.

A. J. Broggini, member of the board of directors, of the Badger Manufacturing Co, engineers, fabricators and constructors of chemical and oil refining plants, Cambridge, Mass., is elected executive vice president and chairman of the executive committee . . . **James Conforti, Jr**, chief engineer and treasurer of the William L. Crow Construction Company, New York, is elected a member of the firm's board of directors . . . **Clifford Swenson** is named president of Carl N. Swenson Co., Inc., San Jose, Calif., general contractors, succeeding **Carl N. Swenson**, who becomes board chairman.

• **Education**—Saint Louis University's Institute of Technology appoints **John F. McCarthy** as director of the new full Department of Civil Engineering. Before joining the institute staff last year, McCarthy was chief structure engineer for W. R. Bendy.

• **Honors**—The Kentucky Society of Professional Engineers names **J. Stephen Wakins**, Lexington consulting engineer, as "Kentucky Engineer of the Year" . . . **Mark K. Wilson, Jr**, of the Mark K. Wilson Company, Chattanooga, Tenn., and **C. A. Willson**, American Iron and Steel Institute, New York are cited by the American Standards Association for their work in the furtherance of the standards movement.



HOW ALABAMA ECONOMICALLY HEATS ITS GIANT INDOOR ARENA

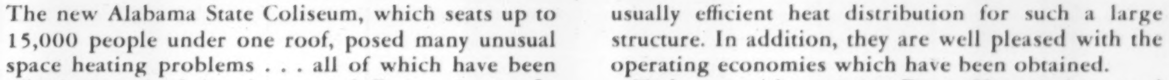
The new Alabama State Coliseum, which seats up to 15,000 people under one roof, posed many unusual space heating problems . . . all of which have been effectively solved by the use of Dravo Counterflo Space Heaters.

Uniform comfort for this huge block-long arena at Montgomery, Alabama, is supplied by seven, automatically-controlled Dravo Heaters. These heaters pull in fresh, outside air and heat it for distribution to all parts of the building.

The operators of this coliseum believe that the Dravo system not only brings temperatures up to comfortable conditions quickly but also provides unusually efficient heat distribution for such a large structure. In addition, they are well pleased with the operating economies which have been obtained.

Today more than 10,000 Dravo Heaters, large and small, have been installed for heating and ventilating all types of industrial and commercial buildings. This is another example of how Dravo has been serving business and industry in a variety of engineering fields for over 60 years. Dravo considers customer satisfaction essential in all its products and services. DRAVO CORPORATION, PITTSBURGH 25, PENNA.

THIS *too* IS DRAVO



Air conditioning • boiler and power plants • bridge sub-structures • compressor and pumping stations

crane cab coolers • docks • dredging • gantry and floating cranes • industrial foundations • locks and dams • marine repairs • open steel flooring

ore and coal bridges • pipe prefabrication and erection • pumphouses and intakes • ready-mixed concrete • river sand and gravel • shipping containers

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Unusually tough, even at sub-zero temperatures, Lukens "T-1" steel can reduce equipment costs.

Failure from abrasion or from impact can happen to the steel in your equipment, too. Here's the answer—the tougher steel you've been looking for. Lukens "T-1" steel has excellent resistance to the combination of wear and impact, is tough enough to withstand unusual stresses and pressures as well as shock at either sub-zero or high temperatures, thus lowering maintenance costs and lengthening equipment life.

Equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Lukens "T-1" steel can be fabricated not only in the shop but also in the field, through proper design procedures. Because of its high yield strength (over 90,000 psi) this new steel offers lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. And Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for equipment builders through the use of wider plates that require fewer welded seams.

The latest addition to Lukens' complete line of carbon, alloy and clad steels, this quenched and tempered alloy plate steel's unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write to: Manager, Marketing Service, 774 Lukens Building, Lukens Steel Company, Coatesville, Pa.

To get the new, 28-page book on Lukens "T-1" steel, ask for Bulletin 781.

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THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Recovery for Extra Work Based on Implied Consent

An owner who knows that extra work is being performed under a contract and who accepts the benefits of it must pay for the additional work.

A contractor in the state of Washington found this a useful rule of law when he was engaged to build the footwalls and set the foundation forms for a structure.

During the course of the work, the owner directed the contractor to do what was necessary to maintain the lateral support of the adjacent land and to prevent any landslide. This required additional excavation not called for by the original contract. Upon the refusal of the owner to pay for this extra work, the contractor sued and was allowed a recovery.[1]

The court held that even though no price was fixed for the extra work the owner had visited the site of the work and knew that it was being performed. Not only did he fail to notify the contractor to stop such work, but he also accepted the benefit.

Under such conditions, the owner was liable to the contractor for the reasonable value of the labor performed and materials furnished, even though the contract provided that the work was to be done at a fixed price.

The contractor was denied interest on the amount of the judgment, since the amount due him was unliquidated and was not determined until the granting of the judgment.

(1) Hopkins v. Ulvesta, 282 P. 2d 806, Supreme Court of Wash., April 26, 1955.

Plumbing Contractor Liable For Faulty Trench Filling

A New York court has held a plumbing contractor liable for faulty work in filling in a trench in a street.

The action was brought by a fireman for injuries sustained when he was thrown from the rear step of a fire truck which struck a bump in the roadway. The bump was created by a plumbing contractor who had undertaken for the home builder the job of digging and backfilling the trench made in the street.

The fireman was granted a recovery[1], the court holding that it was the duty of the contractor to backfill with suitable filling well rammed down and to see to it that the trench in the street was maintained in a safe condition for a reasonable time or until the repaving work was done.

The court, quoting from another case[2], stated: "When one undertakes work in a public highway which, unless carefully done, will create conditions which are dangerous to members of the public using the highway, in the usual and ordinary manner, he is under a duty to use requisite care. That duty cannot be delegated."

(1) Bressingham v. City of New York, et al., 138 N.Y.S. 2d 57, New York Supreme Court, Bronx County, Dec. 17, 1954.
(2) Boylhart v. Di Marco & Reimann, Inc., 270 N.Y. 217, 221, 200 N.E. 793, 794.

Acceptance of Work No Bar To Claim for Latent Defect

Acceptance of work done by a contractor does not prevent the owner from later claiming damages for hidden defects.

Here's such a case. Under the terms of a building contract, the contractor agreed to construct a building with good materials and in a workmanlike manner. After completion, the owner accepted the building and took possession. Hidden defects in workmanship and materials later became apparent.

In permitting the owner to sue both the contractor and his surety for damages for breach of contract, the court said that acceptance does not constitute a waiver of claims in the case of latent defects.[1]

(1) Pillsbury v. Blumenthal, 272 P. 2d 326, Supreme Court of New Mexico, June 1954.

Substantial Performance May Be Difficult to Prove

To recover on the theory of substantial performance, a contractor must show that he has given the owner about what he asked for. Illustrating the point is the following case that arose in Mississippi.

A contractor brought an action to recover a balance he claimed was due under an oral agreement to construct a porch with a concrete floor.

After the floor had been laid, it cracked and the owner refused to pay the contractor, claiming that the agreement required the contractor to use reinforced concrete which he had failed to do. It was this, he said, that caused the defective condition of the porch floor.

The contractor denied this, so that it was a question of fact for the jury to determine whether or not the oral agreement called for a reinforced concrete floor.

The jury found as a fact that the agreement called for a reinforced concrete floor and the court found that under the above circumstances, the contractor was not entitled to recover either on the theory of substantial performance or on the basis of the fair and reasonable value of the work done. This judgment was affirmed on appeal.[1]

The appellate court stated: "In Standard Mill Work & Supply Co. v. Mississippi Steel & Iron Co., 205 Miss. 96, 38 So. 2d 448, we had occasion to deal with the question of substantial performance in a builder's contract and there we pointed out that substantial performance will support a recovery either on the contract or on a quantum meruit (fair and reasonable value) basis provided the contractor has acted in good faith and has not carelessly or intentionally failed to perform the contract; that substantial performance is not literal, full or exact performance in every slight or unimportant detail, but performance of all important particulars; and that substantial performance exists where the building or structure as a whole is not impaired, where it can be used for its intended purpose after erection, where the defects can be remedied without any great expenditure and without any material damage to other parts of the structure and may without injustice be compensated for by deductions from the contract price. To the same effect is Hardin v. Beaman, Miss., 49 So. 2d 732."

(1) Jackson v. Caffey, 78 So. 2d 361, Supreme Court of Miss., March 7, 1955.

Hindrance of Work, Failure To Pay Are Contract Breach

Hindrance of work by an owner and his failure to make monthly payments are a breach of contract. In such cases, the contractor may abandon the job and collect for the value of the work done.

These legal principles were applied in a situation where a cooperative electric company brought an action against the contractor's surety to recover damages alleged to have been sustained as a result of the abandonment of the work by the contractor. The contract was for the construction of a power transmission line.

The contractor intervened in the action and sought to recover for the work done on the basis of fair and reasonable value, claiming that the electric company had breached the contract by having failed to clear the right-of-way in time to permit the contractor to proceed in the usual ordinary manner and also breached

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the contract by having failed to make the contractor the monthly payments called for by the contract.

Judgment was granted to the contractor and was affirmed on appeal.'

In setting forth its views, the appellate court said that the contractor's "bid was submitted and accepted on the express understanding that Co-op would clear the right-of-way. Even if Co-op's exacting specifications for such clearing and the resolution of Co-op's directors concerning both be entirely disregarded, the obligation of Co-op to promptly perform reasonably thorough clearing so as not to hinder or delay Contractor would be implied by law.

" 'In every express contract for the erection of a building or for the performance of other constructive work, there is an implied term that the owner, or other person for whom the work is contracted to be done, will not obstruct, hinder, or delay the contractor, but, on the contrary, will in all ways facilitate the performance of the work to be done by him.* * *.

"In Mansfield v. New York Cen. & H. R. R. Co., 102 N. Y. 205, 6 N. E. 386, the court said that the contract implied 'an understanding by all parties that they were to be unrestricted in the employment of means to perform it, and that nothing which it was the duty of the owner to do to enable the contractor to perform, should be left undone'. Haley v. Brady, 17 Wash. 2d 775, 137 P. 2d 505,511, 146 A.L.R. 859,867.

"That an implied, if not express, covenant is contained in this contract, requiring defendant to furnish and deliver the site in a condition to permit the work to be done, and that a failure so to do is a wrongful breach of the contract for which the contractor may recover damages, is well settled by numerous cases.* * *

"Manifestly, when time is made the essence of the contract and the contractor is required to complete it within a fixed period, he acquires an equal right to complete it during that period, and no construction of isolated paragraphs can be indulged in or permitted which shall destroy the essence of the contract and deprive it of its mutuality.' Bates & Rogers Const. Co. v. Board of Commissioners, D. C., 274 F. 659, 661."

As to the point that the failure to make monthly payments constituted a breach of contract, the court quoted from the case of Guerini Stone Co. v. P. J. Carlin, 248 U. S. 334, 39 S. Ct. 102, 106, 63 L. Ed. 275, as follows: "The Circuit Court of Appeals very properly held that in a building or

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construction contract like the one in question, calling for the performing of labor and furnishing of materials covering a long period of time and involving large expenditures, a stipulation for payments on account to be made from time to time during the progress of the work must be deemed so material that a substantial failure to pay would justify the contractor in declining to proceed."

(1) Northeast Clackamas County Electric Co-Operative, Inc. et al. v. Continental Casualty Co. et al., 221 F. 2d 329, U.S. Court of Appeals, April 6, 1955.

Some Rules That Are Used In Interpreting Contracts

A cardinal rule of construction of contracts is that each and every portion of a contract is to be given effect, if possible. Where all provisions, stipulations and conditions may be given effect without contradicting each other, the contract is not uncertain or ambiguous.

Where the language of a contract is doubtful, or where it appears indefinite or uncertain, the contract should be interpreted most strongly against the party who drew it.

The intent of a contract is to be determined from the contract itself, if it is possible to do so. The parties are bound by what the contract says rather than by what they say.

One bidding for a construction job has a right to rely upon the plans and specifications furnished by the representative of the owner. The respective obligations of the parties are to be measured in accordance with the plans and specifications upon which the contractor submitted his bid.[1]

(1) Gardner v. City of Englewood, 282 P. 2d 1084.

Sub Not Liable For Delays Caused By Prime Contractor

Liquidated damages for delayed performance can't be recovered from a sub by a prime contractor, if the latter or his agents were primarily responsible for the delay.

In one case that arose, a prime contractor had caused delay in the progress of part of the work being done by a subcontractor. There was no subsequent agreement for an extension of time to offset the delay.

The court held that the time limitation and liquidated damage provisions of the contract became ineffective. The subcontractor was left only with the obligation of completing his part of the work within a reasonable time.[1]

In discussing the law, the court

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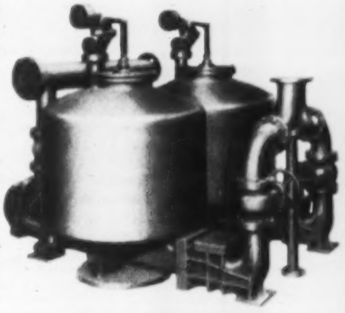

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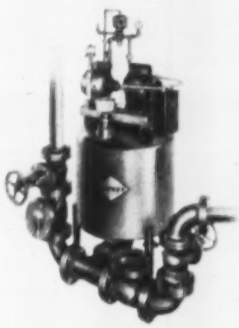

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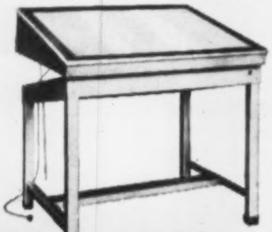

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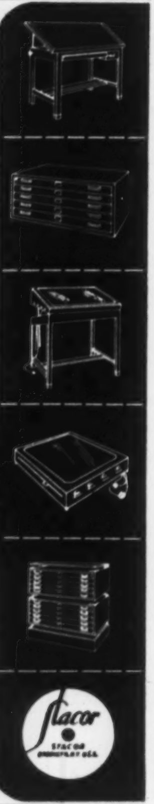

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made this observation: "The rule is succintly stated in Gogo v. Los Angeles Flood Control Dist., 45 Cal. App. 2d 334, 114 P. 2d 65, 70, where the court said, 'The correct rule is that where such delays are occasioned by the mutual fault of the parties, the court will not attempt to apportion them but will refuse to enforce the provision for liquidated damages.' Sound reasoning for this general rule is set forth in Champlain Const. Co. v. O'Brien, C.C.D.Vt., 117 F. 271, 277, wherein it was stated, 'There is no way for summing up the defaults of each and apportioning the damages to them, but the whole must be allowed or none; and, as all cannot be, none must be.' "

(1) Melwin Const. Co., Inc. v. Stonewall Const. Co., 113 A. 2d 108, Municipal Court of Appeals, District of Columbia, April 4, 1955.

Law Provides Exception For Extra and Unforseen Work

The courts have developed a special rule of law that helps a contractor who, after starting a job, encounters unforeseen difficulties that require more work than either party contemplated when the contract was made.

In such a situation, the courts have held that an owner's promise to pay for the extra work is binding, even though it would be unenforceable under general contract law because of lack of consideration.

In Maryland, for example, a contractor had agreed to level a piece of land and had assumed that the cuts and fills would balance. After the work was started, he discovered that considerable additional fill would be required to level the ground. The owner agreed to pay for the additional fill. The court ruled that the agreement was valid and binding.[1]

"It is undenied," the court said, "that the owner and contractor both thought it to be a solid fact that the cuts and fills would balance. Certainly the discovery that outside fill dirt to the value of thousands of dollars—more than the whole of the original contract cost—would be needed to reach grade, was not only evidence of a mutual mistake but of revelation of unforseen difficulty. In Lange v. United States, 4 Cir., 120 F. 2d 886, 890, Judge Dobie, for the court, pointed out that the general rule is that doing something one is under a legal obligation to do, is not consideration which will support a promise to pay additional compensation therefor, and said: 'But to this rule the Court of Appeals of Maryland admits an exception, an exception criticized by Williston on Contracts, Section 130(a), but seemingly recognized in Restatement in Section 76, Illustration 8.' Judge Dobie observed that' . . . both parties were taken by a surprise which might have been avoided had either party taken the necessary precautions. We, therefore, are of the opinion that the pending case falls within the principle and spirit of the exception set out in Linz v. Schuck, 106 Md. 220, 67 A. 286, 11 L.R.A., N.S. 789; and we are confirmed in this view by the disposition of the Court of Appeals of Maryland, manifested in later cases, to give a liberal application to the exception of unforeseen difficulties. See Dickson & Tweeddale v. Fowler, 114 Md. 344, 79 A. 519; People's Banking Co. v. Fidelity & Deposit Co., 165 Md. 657, 170 A. 544, 171 A. 345.' "

(1) Evergreen Amusement Corp. v. Harold D. Milstead, 112 A. 2nd 901, Court of Appeals of Maryland, March 28, 1955.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

Obituaries

H. C. R. Schrank, 56, who spent many years mapping areas of Tennessee and Georgia for the Tennessee Valley Authority, died Jan. 26, at Brevard, N. C. He served at one time as engineer for Lauderdale County, Miss. Schrank was a civil engineering graduate of Georgia Tech.

Duncan A. Black, 58, vice president of Blaw-Knox Construction Co. and general manager of the firm's Power Piping Division, died Jan. 14. Following his graduation from Carnegie Institute of Technology, Black joined Power Piping Co. and remained with the company until its absorption by Blaw-Knox in 1937.

Lloyd M. Salisbury, 66, consulting civil engineer, died Feb. 1 at Montville, N. J. He had been a construction engineer for the Equitable Life Assurance Society for over 25 years. He was graduated from Yale's Sheffield Scientific School in 1911.

Arthur H. Symons, 83, president of Symons Clamp and Manufacturing Co., Chicago, died Jan. 31. A pioneer in the concrete building equipment and supply industry, he founded the firm which bears his name in 1910. Symons was an 1898 graduate of Kansas University.

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There are several reasons why America's business management attacked this decline in sales with more advertising. One of them grew out of the greatly strengthened position of the American consuming market. Consumers' income after taxes has been rising an average of over $10 billion a year since 1946, and this rising income is more widely distributed than ever before. Furthermore, consumers have piled up reserves of about $215 billion in cash or its equivalent. These reserves offer a new and powerful inducement to increased selling and advertising effort even in the face of a possible decline in consumer income.

Taking the Longer View

However, the principal reason why a sales decline was attacked with increased advertising is management's new-found conviction that good advertising is essentially an investment in the development of a market. Successful development requires sustained investment. The inclination of business management to take this longer view, is, of course, motivated by the fact that the American market, with over 3 million consumers being added annually, is growing at a prodigious rate.

Ten years ago only a handful of companies had plans for investment in new producing facilities extending beyond the current year. Today almost all leading companies have investment programs running some years ahead. And keeping pace with these long-range business investment plans has been the development of sales and advertising programs to

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Today abundance so completely prevails in the United States that it has been conservatively estimated that as much as a third of everything offered for sale falls in the realm of "optional consumption." That is, consumers can "take it or leave it" without any immediate personal inconvenience. But if they decide to "leave it," a terrific economic depression will not be far behind. In such circumstances, advertising—in which, in all of its forms, we are now investing about $9.2 billion annually—clearly is of crucial importance to our continued prosperity.

In performing its key role in past years, American advertising never realized its full potential. It successfully promoted sales. But it never was called upon to promote an overall economic stability as a direct outgrowth of increased sales.

By successfully promoting both sales and economic stability, as it did in 1954, advertising surely has added new strength to the American economy. It has also added a great new and constructive dimension to advertising itself. This accomplishment makes the celebration of our first National Advertising Week (February 19-25) a particularly notable occasion.

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J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Mass., Danvers—BA 2/24—Town, Daniel J. McFadden, town hall, interceptor sewer. $75,000. Plans deposit $20, refundable. CD 3/28.

Mass., Marblehead—BA 2/29—Town, Bd. Health, Dr. William T. Haley, chn., Contr. 1956-1, furnishing, erecting incineration equip. municipal refuse incinerator, off Beacon St., $60,000; Contr. 1956-2, incinerator off Beacon St., $90,000. Plans deposit $10, refundable. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs. CD 1/30/53, under Mass., Beverly.

BUILDINGS—BA

Mass., Brookfield—SCHOOL—BA 3/1—Town, School Bldg. Comn., c/o T. B. Thompson, supt. Schools, 177 Main St., North Brookfield, elementary school, Main and Prouty Sts. $350,000. Extended date. Plans deposit $50, refundable. Doak Martin, 8 Norwich St., Worcester, archt. CD 1/30.

HEAVY CONSTRUCTION—LB & CA

† **Bacon & Robinson Co.,** 24 State St., Bangor, Me. LB **$93,645,** est. $100,000. conversion heating furnaces for housing units, Dow Air Force Base, IFB 17-601-56-40, BANGOR, ME. Base Procurement Office, Dow Air Force Base, Bangor, Me. Eaton W. Tarbell & Assoc., Inc., 84 Harlow St., Bangor, Me., archt.

† **Dist. P. Wks. Office,** First Naval Dist., 495 Summer St., Boston, Mass., rejected bids Dec. 14, replace dewatering pumps, Naval Shipyard, Drydock No. 2, NOY 9076, Spec. 48704, PORTSMOUTH, N. H. LB **$786,745,** est. $800,000. CD 12/29, under LB.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Mass.—**Bayer & Mingolla Constr. Co., Inc.,** 550 Park Ave., Worcester, Mass. LB **$341,897,** est. $375,000. hy. constr., Chicopee and Springfield;

Mass.—**W. W. Wyman, Inc.,** 324 Wells St., Greenfield, Mass. LB **$127,953,** est. $112,131. hy. reconstr. Rte. 23, Russell. Bids Jan. 31. CD 1/5.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

E. T. O'Neil & Son Constr. Corp., 223 Commercial St., Holyoke, Mass. LB **$136,773,** est. $123,000. ER-6 Sec. 3, hy. and bridge work (2 bridges over Conant Brook and Margaret Brook) Rte. 32, Monson. Bids Jan. 31. CD 1/25.

▲ **CONNECTICUT**—State Hy. Dpt., State Office Bldg., Bridgeport,

Terry Contg., Inc., 31 E. 27 St., New York, N. Y., CA, **$6,380,106,** Proj. 311-02, superstructure for Bridgeport Harbor Bridge, Bridgeport. Bids Jan. 16. CD 1/18, under LB.

▲ **CONNECTICUT**—State Hy. Dpt., State Office Bldg., Hartford,

Conn.—**Union Bldg. & Constr. Co.,** 631 Main Ave., Passaic, N. J., CA, **$6,513,616,** Proj. 320-01, 33,442 lin. ft. grading, drainage, b. conc., incl. grade separation structures at Featherbed Lane, Branford Steam R.R., Rte. 146, Quarry Rd., Moose Hill Rd., Rte. 1, Long Hill Rd., West River, Rte. 77, State St., Goose Lane, Tanner Marsh Rd., Branford and Guilford;

Conn.—**M. A. Gammino Constr. Co.,** 728 Valley St., Providence, R. I., CA, **$8,187,840.** Proj. 319-01, 31,026 lin. ft. grading, drainage, pavement, incl. 12 grade separation structures over water and bridge over N. Y., N. H. & H. R.R., c. conc. pavement 16,586 lin. ft. and b. conc. 14,440 lin. ft., East Haven and Branford. Bids Jan. 9. CD 1/11, under LB.

▲ **CONNECTICUT**—State Hy. Comn., State Office Bldg., Hartford,

John R. Arborio, Inc., W. Cedar St., Poughkeepsie, N. Y., CA, **$4,072,983,** Proj. 315-02, Conn. Turnpike, c. conc., incl. grade separation structures, 15,600 lin. ft. Morgan Lane, Alling Crossing Rd., Saw Mill Rd., Greta St. and Shumway Rd., Orange and West Haven. Bids Jan. 4. CD 1/6, under LB.

BUILDINGS—LB & CA

F. X. Laliverte & Son, Inc., Central St., Southbridge, Mass. CA Approx. **$350,000.** ADMINISTRATION BLDG. CLASSROOM BLDG., DUDLEY, MASS. Nichols Junior College, James L. Conrad, pres., Dudley, Mass. CD 12/20.

Concrete Constr. Co., 165 Chelsea St., Everett, Mass. LB **$417,210.** Beefee SCHOOL, West Foster St., MELROSE, MASS. City, Supt. Schools, 585 Main St., Melrose, Mass. Bids Jan. 31. CD 1/9.

Smith Constr. Co., 101 Water St., Derby, Conn., CA, **$150,000.** brick, cinder block WAREHOUSE, NORTH HAVEN, CONN. Northern Realty Co., 595 Ellsworth Ave., New Haven, Conn. Awarded Jan. 31.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

† **D. C., Wash.**—FURNACES—BA 2/21—Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, installing vacuum arc furnaces, Bldg. 3-4, Naval Research Laboratory, NOY 91961. Plans deposit $10.

Pa., Phila.—BA 2/21—City, Dpt. Procurement, City Hall Annex, Bids 2554, Contr. 700-W, water mains in Conshohocton Ave. and other locations; 2555 Contr. 693-W grading, relay of water mains in Blakiston St., Frankford to Torresdale Aves., Conwell Ave. to Montour St.; 2498-82 Contr. SO-200-SW intercepting manhole and sewer, Spruce St. west of 25 St. CD 3/11/46.

Pa., Phila.—BA 2/23—City, Dpt. Procurement, City Hall Annex, grading; b. conc.; b. conc. paving; grading, c. conc. paving; b. conc. resurf.; constr. drainage facilities, West River Dr., Fairmount Park, traffic signal installation work. CD 10/30/44.

N. Y., Geneva—BA 2/28—Bd. P. Wks., City Hall, Harry M. Bolton, supt. and city engr., furnishing, installing 4,000 ft. 20 in. main along Hamilton St., 2,600 ft. 8 in. main in North Genesee St. West Ave. and Mill St. together with valves fittings and appurtenant structures. Plans deposit $15. Donald E. Stearns, Cazenovia, P. E., civil and sanitary engrs., adv. ENR 2/16.

† **O., Lacarne**—BA On Or About 37—U. S. Eng., 237 Fourth Ave., Huntington, W. Va., constr. dike protection sys., Erie Ordinance Depot, in Ottawa Co. approx. 5.5 mi. west of Port Clinton and approx. 1.6 mi. north of Lacarne, ENG-46-022-56-15.

N. Y., Delmar—BA 3/9—Bd. Water Comrs., Water Dist. 1, Town Hall, Town of Bethlehem, Delmar, transmission main and distr. reinforcement, Contr. No. 5, incl. approx. 800 ft. 24 in. pipe line from reservoir dike to filtration plant. 2,300 ft. 16 in. main from filtration plant to softener plant, interconnections between proposed main and existing mains in vicinity of softener plant, 43,000 ft. 16 in. transmission main venturi and regulating chambers, 8,000 ft. 12 in. distr. reinforcement, pavement restoration. Plans deposit $20. Benjamin L. Smith & Assoc., 11 N. Pearl St., Albany, engrs., adv. ENR 2/16.

BUILDINGS—BA

▲ **N. Y., New York**—SCHOOL—BA 2/29—Director Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, P.S. 111, W. 51 St. and 10 Ave., Manhattan Boro. Plans deposit $25 general constr., $8 each for plumbing and drainage, heating and ventilating, electrical work and lighting fixtures. CD 1/20/55.

P R O J E C T S C O V E R E D

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: **Before and including appointment of engineers or architects.**
BIDS ASKED: BA **(new announcements only). For full calendar, see also preceding issues.**

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB **On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.**

CONTRACTS AWARDED: CA **Except awards to low bidders previously reported in low bidder stage.**

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	**Federal Government**
▲	**Project of $1,000,000 or over.**
ENR	**Engineering News-Record**
CD	Construction Daily

For additional reports see Construction Daily.

HEAVY CONSTRUCTION—LB & CA

Avon & Fowler, Inc., Cazenovia, N. Y. LB **$67,995.** 5,400 ft. 12 in. transmission main, tank fdn., meter and appurtenances, LIVERPOOL, N. Y. Village, 314 Second St., Liverpool, N. Y. Bids Jan. 30. CD 1/13.

Loucks Electric Co., Inc., Feura Bush, N. Y. LB **$111,445.** electric work for ground lighting system, Rockland State Hospital, ORANGEBURG, N. Y. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Jan. 12. CD 1/12.

Piccotti Constr. Co., Old Forge, Pa. LB **$148,106.** general constr. maintenance bldg. adjacent to Pocono Interchange of Northeastern Turnpike Extension, PENNSYLVANIA Turnpike Comn., 11 N. Fourth St., Harrisburg, Pa. Bids Feb. 1. CD 1/16.

NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton,

rejected bids Jan. 31, median dividing strip on Pulaski Skyway (U.S. Rtes. 1 & 9) Jersey City, Kearny and Newark wid'n. U.S. Rtes. 1 and 9 (trunk) from Wall Ave. to Freeman Jersey, Hudson and Essex Counties, LB **$236,265.** CD 2/3, under LB.

▲ **LaFera Contg. Co.,** 149 Verona Ave., Newark, N. J. LB **$1,285,000.** Contr. 55, Turtle Creek Interceptor, PITTSBURGH, PA. Allegheny County Sanitary Auth., 200 Ross St., Pittsburgh, Pa. Bids Jan. 31. CD 1/25.

† **S. G. Mastriani Co., Box 509,** Scranton, Pa. CA **$87,835.** alterations, addns. to outside utilities and site imprvs., Tobyhanna Signal Depot, Contr. No. DA 36-109-ENG-6164, TOBYHANNA, PA. U. S. Eng., 2635 Abbottsford Ave., Phila., Pa. CD 2/9/51, under Public Buildings.

† **J. A. LaPorte, Inc.,** 1101 Wilson Blvd., Arlington, VA. LB **$184,632.** maintenance, new work dredging of Neale South, Island Creek, St. Patricks Creek, Md. and Whiting Creek, Urbanna Creek and Totuskey Creek, Va., CIVENG-49-080-56-22, MARYLAND and VIRGINIA. U. S. Eng., First and Douglas Sts. N. W., Wash., D. C. Bids Jan. 31. CD 1/20.

† **American Constr. Co.,** 2601 Constitution Ave. N. W., Wash., D. C., CA, **$520,900,** furnishing material and perform work for reconstr., repair, alterations and imprvt. to area located above and in vicinity of legislative garage, U.S. Capitol, WASH, D. C. Architect of Capitol, U.S. Capitol, Wash., D. C. Bids Dec. 29, awarded Feb. 2. CD 1/6, under LB.

† **Norfolk Dredging Co.,** P. O. Box 486, Norfolk, Va., LB. **$202,314,** maintenance dredging of Washington channel, Washington Harbor, CIVENG-49-080-56-14, WASH., D. C. U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C. Bids Jan. 31. CD 1/16.

BUILDINGS—LB & CA

Laur & Mack, Niagara Falls, N. Y. CA Est. **$93,000.** second floor addn. to rare metals PROCESSING PLANT, AKRON, N. Y. Carborundum Metals Co., Akron, N. Y. S. Fruchtbaum, 1965 Sheridan Blvd., Kenmore, N. Y., engr.

▲ **Fair Oaks at Bellport Homes,** c/o Henry A. Klar Realty Co., 220-02 Horace Harding Blvd., Bayside, N. Y. Owner Builds. **$8,000,000.,** 1,000 HOUSES on tract on Montauk Hy., BELLPORT, N. Y.

▲ **Beechwood at Bethpage Homes,** c/o Stanley H. Klein, archt., 89-31 161 St., Jamaica, N. Y. Owner Builds. **$1,000,000.** 57 HOUSES on tract on Farmers Ave. south of Old Country Rd., BETHPAGE, N. Y.

Glen Ridge Homes, c/o Herman H. York, archt., 90-04 161 St., Jamaica, N. Y. Owner Builds. **$350,000.** 25 HOUSES on tract at Elwood Rd. and Fourth Ave., EAST NORTHPORT, N. Y.

▲ **Highcrest Homes,** c/o Lane Realty, 107-40 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$2,800,000,** 200 HOUSES on tract at Main St. and Frank Ave., addnl. section, FARMINGDALE, N. Y.

Brookside Estates, c/o Henry A. Klar Realty Co., 220-02 Horace Harding Blvd., Bayside Hills, N. Y. Owner Builds. **$600,000.** 20 HOUSES on tract at Brookside and Prince Aves., FREEPORT, N. Y.

A. Friederich & Sons Co., 710 Lake St., Rochester, N. Y., CA, STORE BLDG., No. 215, ROME, N. Y. S. S. Kresge Co., 370 Lexington Ave., New York, N. Y. Bids Jan. 18. CD 1/18.

▲ **McKay Constr. Co.,** 112 Farrier Ave., Oneida, N. Y. LB **$1,037,000.** Laurel Street SCHOOL addn., ROME, N. Y. Bd. Educ., Rome, N. Y. Bids Feb. 1. CD 1/24.

▲ **Urban Developmers, Inc.,** c/o S. J. Kessler & Sons, archts., 551 Fifth Ave., New York 17, N. Y. Separate Contracts, **$16,000,000.** slum clearance HOUSING, incl. eight 16 story bldgs. for 2,000 families, on tract bounded by Hudson Blvd. Summit and Newark Aves. and adjoining tract opposite City Hall, JERSEY CITY, N. J. CD 9/12.

Kings Point Homes, c/o Arthur Williamson & Co., 484 Route 17, Paramus, N. J., Owner Builds, **$650,000.**

(Continued on page 248)

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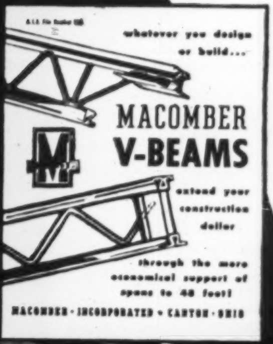

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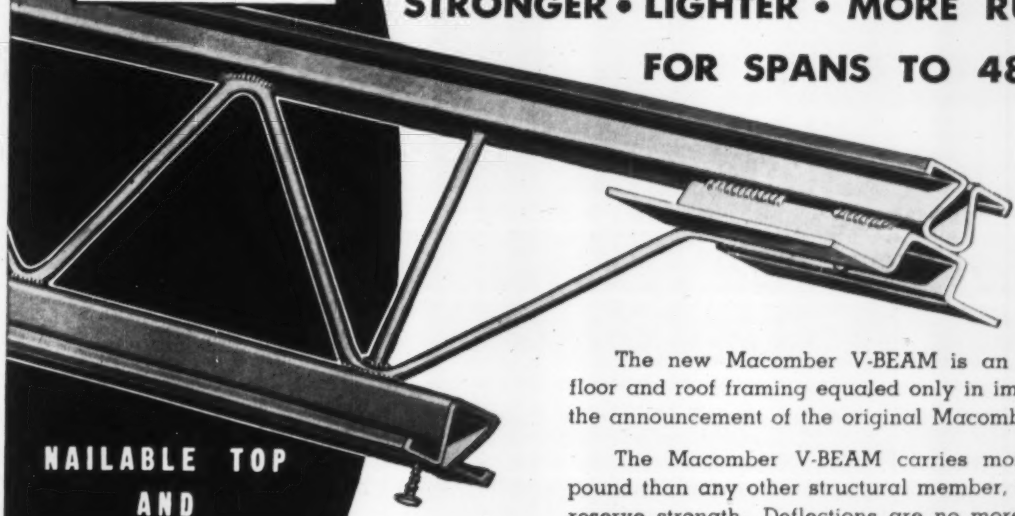

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- NAILABLE STEEL JOISTS
- LONGSPANS
- BOWSTRING ROOF TRUSSES
- METAL DECK
- V-LOK STEEL FRAMING
- STRUCTURALS

(Continued from page 246)

43 HOUSES on tract at East Road and Swantzel Dr., MIDDLETOWN, N. J.

▲ **L-D Building Co.**, Latrobe, Pa. LB **$3,286,000.** general constr. 1 and 2 story SENIOR HIGH SCHOOL, AUDITORIUM, swimming pool, 2 athletic fields, parking area, BUTLER, PA. Butler Area Joint School Dist., Butler, Pa. Bids Jan. 16, CD 12/7;
Sans Corp., 132 Blackstone Ave., Jamestown, N. Y. LB **$541,373.** heating work (Butler, Pa.).
Cardest Plumbing Co., 2324 Josephine St., Pittsburgh, Pa., LB **$539,000,** plumbing work (Butler, Pa.)

▲ **John McShain, Inc.**, 17 and Spring Garden Sts., Phila., Pa. CA general constr., 4 women's RESIDENT BLDGS., DINING HALL for Pennsylvania State University, UNIVERSITY PARK, PA. Total Est. **$4,000,000.** Pennsylvania State University, University Park, Pa. Bids Jan. 19, CD 1/10;
The Hughes Corp., 245 Charles St., Luzerne, Pa. CA plumbing work, (University Park, Pa.);
Lehigh Engineering Co., 2604 N. Fairhill St., Phila., Pa. CA heating work, (University Park, Pa.);
Riggs-Distler & Co., 1518 Walnut St., Phila., Pa. CA electrical work, (University Park, Pa.).

Crump, Inc., 4031 Bigelow Blvd., Pittsburgh, Pa. CA Est. **$200,000.** 3 story, 60x160 ft., brick, block, steel PLANT CAFETERIA BLDG., WEST HOMESTEAD, PA. Mesta Machine Co., West Homestead, Pa.

▲ **D. C. Govt. Director Bldgs. & Grounds**, 499 Pa. Ave. N.W., Wash., D. C., rejected bids Dec. 9, constr. 4 projects at CHILDREN'S CENTER, LAUREL, MD. LB **$1,279,500.** Will re-advertise. CD 12/13, under LB.

▲ **M. Pollin & Sons**, 931 Longfellow St. N. W., Wash., D. C., Owner Builds; **$2,000,000** 3 story, 199-unit, brick, cinder block, rein.-con., APARTMENT, 6101 16 St. N. W., WASH. D. C. Berla & Abel, 2000 P. St. N. W., Wash., D. C., archts.

SOUTH

HEAVY CONSTRUCTION—BA

† **Va., Norfolk**—BA 2/21—Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Zone 11, misc. paving projects, Naval Communication Station (Driver and Northwest), NOY 93495, Spec. 49891 (SF). Plans deposit $10.

† **Va., Norfolk**—CELL BLOCKS—BA 2/28—Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Zone 11, install cell blocks, Bldg. CA-31, Naval Retraining Command, Naval Base, NBY-616, Spec. 616/56. Plans deposit $10.

† **Ky., Fort Campbell**—WATER TREATMENT PLANT—BA 2/29—U. S. Eng., 303 Federal Office Bldg., Nashville, Tenn., altering water treatment plant, ENG-40-058-56-30. Bids 10/19 rejected. CD 10/6.

Virginia—FERRY SLIP REPAIRS—BA 2/29—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond, repair Newport News, Old Point, and Pine Beach ferry slips.

† **N. C., Southport**—FACILITIES—BA About 3/2—U. S. Eng., 308 Customhouse, Wilmington, altering existing facilities, Sunny Point Army Terminal, ENG-31-075-56-44. Plans deposit 80c.

BUILDINGS—BA

† **Ky., Fort Campbell**—SCHOOL—BA 2/29—Housing & Home Finance Agency, Peachtree and Seventh Bldg., Atlanta, Ga., 1 story, 27,500 sq. ft. Junior High School Ky. 56-C Fed. 1-B6. $400,000. Plans deposit $7.50. Lee Potter Smith & Assoc., 2227 Broadway, Paducah, engrs.-archts. CD 1/27.

Ky., Covington—HOSPITAL—BA 3/6—Booth Memorial Hospital, 323 E. Second St., 1 story, brick, steel north wing addn., enlargement of dietary X-ray and treatment rooms. $400,000. Plans deposit $25. E. C. Landberg & Assocs., 114 Garfield St., Cincinnati, O., archts. CD 4/22.

† **N. C., Raleigh**—TRAINING CENTER—BA 3/6—U. S. Eng., 308 Customhouse, Wilmington, repairs to USAR Training Center, ENG-31-075-56-18. Plans deposit 40c.

▲ **Va., Norfolk**—HOSPITAL WING—BA About 4/12—Norfolk General Hospital, Raleigh Ave., 9 story first wing of hospital. $4,000,000. Plans deposit $75. Vernon A. Moore, 716 W. 20 St., archt. CD 1/27.

BUILDINGS—SLC

Ky., Louisville—FREIGHT DEPOT, etc.—Southern Railway Co., G. H. Echols, ch. engr., P. O. Box 1808, Wash., D. C., soon lets contract 51x306 ft. brick, concrete block freight depot and office, 15 and Magnolia St. $750,000. Charles Roth, Transportation Bldg., Cincinnati, O., archt. John C. Morrell, 6 E. Fourth St., Cincinnati, O., elec. engr. CD 10/13.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond,
Bowers Constr. Co., Box 1706, Raleigh, N. C., CA **$2,422,071,** Hampton Creek Bridge, East Branch Creek Bridge and approaches, Contr. No. B-2 (Hampton Roads Proj.). Bids Jan. 25. CD 1/27, under LB.

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh,
Suber & Co., Inc., Whitmire, S. C., CA **$962,410.** grading 11.55 mi. US 29 (reloc.), Proj. 6522. U-647 (3), F 647 (2), Mecklenburg Co Bids Jan. 24, awarded Jan. 31. CD 1/27, under LB.

▲ **NORTH CAROLINA**—State Hy. & P. Wks. Comn., Raleigh,
Wannamaker & Wells, Inc., Orangeburg, S. C., CA **$1,243,353.** Parts A and B structures, 11.55 mi. US 29 (reloc.), Proj. 6522, U-647 (3), F-647 (2), Mecklenburg Co. Bids Jan. 24, awarded Jan. 31. CD 1/27, under LB.

† **NORTH CAROLINA**—Bureau P. Rds., Dpt. Commerce, Gatlinburg, Tenn.,
Ralph E. Mills Co. Inc., 410 Ann St., Frankfort, Ky., LB **$359,666,** Proj. 242, base course, stockpiling addnl. base course material 1.836 mi. Blue Ridge Parkway from Ravensford Swain Co. Bids Jan. 13. CD 12/22.

▲† **NORTH CAROLINA—Bureau P. Rds. Dpt. Commerce, 1440 Columbia Pike, Arlington, Va.,**
Macon Constr. Co., Franklin, N. C., LB $1,243,440. grading, 3 tunnels, draining, base course, from 2 mi. west of Big Witch Gap to southwest side of Sherrill Cove, 2.82 mi. Proj. 2Z5, Blue Ridge Parkway Swain Co. Bids Jan. 27. CD 12/29.

† **Dawson Eng. Co.**, 10 Gillon St., Charleston, S. C. LB, **$99,249.** concrete aircraft washrack, paving, etc., Charleston Air Force Base, CHARLESTON, S. C. U. S. Eng., Customhouse, Charleston, S. C. Bids Jan. 22. CD 12/14, under LB.

† **U. S. Eng., P. O. Box 867, Little Rock, Ark., cancelled bids to have been opened Feb. 16, Job. No. England AFB-56-ACRP-AF crash and structural fire station, Item No. D184-000, England Air Force Base, ALEXANDRIA, LA. CD 1/11.**

Vinson & Hodkin, Denham Springs, La. CA **$157,305.** drainage imprvs., north Branch and Ward Creek and lateral and Baker Canal, White Bayou involving channel excav., BATON ROUGE, LA. City and Parish Purch. Agent, Court House, Baton Rouge, La. Bids Jan. 10.

BUILDINGS—LB & CA

▲ **Catalytic Constr. Co., 1528 Walnut St., Phila., Pa.**, CA Est. **$10,000,000.** design and construct plastics PLANT, WASHINGTON, W. VA. Marbon Chemical Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill. CD 6/6.

▲ **George A. Creed & Son.**, Leesburg Rd., Columbia, S. C., CA **$1,164,140,** 112-bed HOSPITAL, CAMDEN, S. C. Kershaw Co. Comn., Camden, S. C. Awarded Jan. 25. CD 12/1, under LB.

Archer Bros., 3143 Maple Dr., Atlanta, Ga., CA **$572,988,** Headland HIGH SCHOOL, ATLANTA, GA. Fulton Co. Bd. Educ., Court House, Atlanta, Ga. CD 12/13, under LB.

Inman Constr. Co., 2800 W. Jefferson St., Louisville, Ky. CA **$114,900.** (12 bidders) FACTORY addn., LOUISVILLE, KY. Peaslee-Gaulbert Corp., 226 N. 15 St., Louisville, Ky. Bids Jan. 31, awarded Feb. 1. CD 1/23.

Struck Constr. Co., 147 N. Clay St., Louisville, Ky. LB **$435,200** (12 bidders) general contract EDUCATIONAL AND RECREATIONAL BLDG., LOUISVILLE, KY.

(Continued on page 250)

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Lasting repair of bridge or pier piling eroded in the tidal range is now a routine procedure using the "DRI-POR" system of pile encasement.

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BALTIMORE 26, MD.

New State office building, Olympia, Wash. (foreground). *Architect:* A. Gordon Lumm, Tacoma. *General Contractor:* Macdonald Building Co., also of Tacoma. *Structural Engineers:* Stevenson and Rubens, Seattle.

Two New Government Buildings in State of Washington

Here are two new government buildings in the State of Washington—a post office annex in Seattle and an office building for the state government in Olympia.

In Olympia, a new $4 million five-story office building will house some twelve state departments. The entire structure, built of reinforced-concrete columns, beams, joists and slabs, is earthquake-resistant. Nearly 700 tons of reinforcing bars, rolled by Bethlehem Pacific Coast Steel Corporation, Bethlehem's West Coast subsidiary, were used in the construction of this building.

The new $4½ million Terminal Annex post office building in Seattle is located on Lander St. between Third and Occidental Aves. The building contains some 410,000 sq ft of floor space and will be staffed by 1500 employees. Bethlehem Pacific supplied 1550 tons of fabricated reinforcing bars.

Bethlehem is well equipped to give excellent service in supplying fabricated reinforcing bars to any part of the country. Bars reach you promptly, bundled and tagged, cut and bent and ready for placing.

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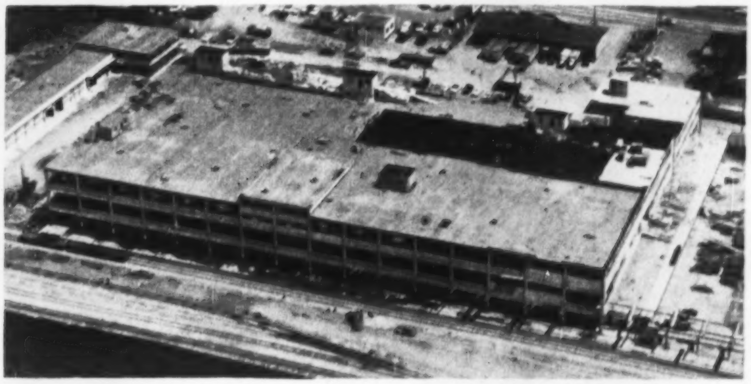

Terminal Annex Post Office building, Seattle. *Architect:* John Graham and Co., Seattle. *General Contractor:* Howard S. Wright and Co., also of Seattle.

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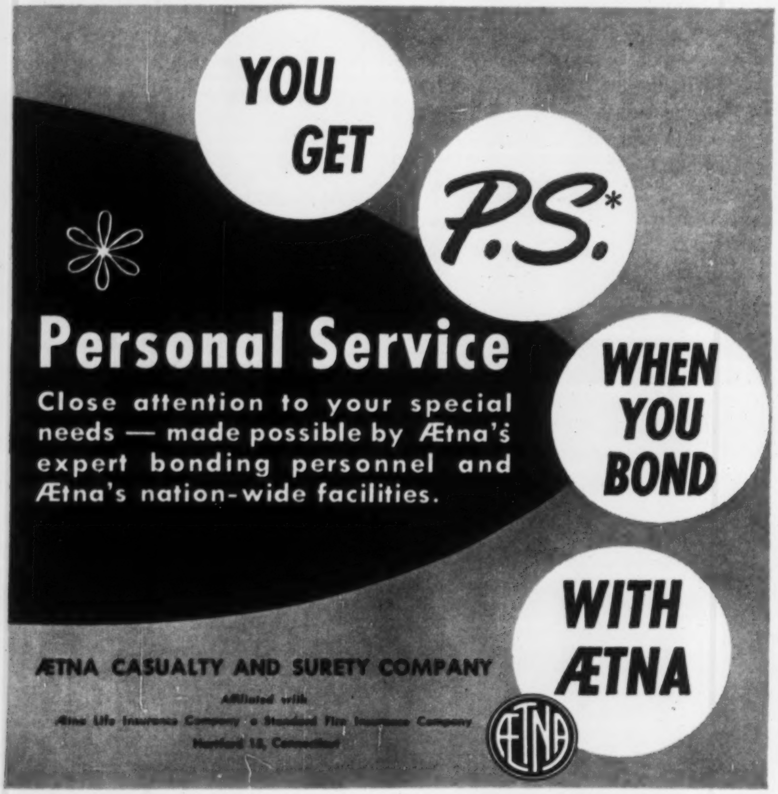

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Hartford 15, Connecticut

(Continued from page 248)

Crescent Hill Baptist Church, 2800 Frankfort Ave., Louisville, Ky. Bids Jan. 19. CD 12/27.

▲ **Struck Constr. Co.**, 147 N. Clay St., Louisville, Ky. CA Est. **$1,000,000.** 3 story, rein.-con., masonry RESEARCH BLDG. at present plant, LOUISVILLE, KY. Brown Williamson Tobacco Co., 16 and Hill Sts., Louisville, Ky. Ossian P. Ward, Washington Bldg., Louisville, Ky., archt. Awarded Jan. 30.

E. E. Garst, 325 W. Ormsby Ave., Louisville, Ky. CA **$100,000.** depression for R.R. BLDG. No. 2 and TRUCK docks BLDG. No. 2, Benchel, LOUISVILLE, KY. General Electric Co., Appliance Park, Louisville, Ky. Hartstern, Louis & Henry, McDowell Bldg., Louisville, Ky., archts. Bids Dec. 9, awarded Dec. 30. CD 5/23/51.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

O., Toledo—BA 2/14—Comrs. Lucas Co., Court House, Sewer Line No. 304, Cady St. from existing Sanitary Sewer No. 258 to the Ohio Turnpike; Richland Ave., Kirk St. and Rosedale Ave. all from 7th St. to Ohio Turnpike; Crystal Ave. from Cady St. to Rosedale Ave. Main Sewer District No. 10. Est. $100,000. Raymond E. Hall, Jackman Rd., co. sanitary engr. Bids Nov. 23, rejected. CD 11/18.

Mich., Ypsilanti—BA 2/27—City, Bettey Fenker, clk., water plant addns. Plans deposit $20, refundable, McNamee, Porter & Seeley, 306 State Savings Bank Bldg., Ann Arbor, engrs. CD 11/21/44.

† **Wis., Madison**—PAVING AREA—BA 2/27—Procurement Office, Building 600, Truax Field, Madison, Zone 6, paving area around Building 106 and rear Building 403 with hot-mix bit. material, Truax Field, I.F.B. 47-602-56-28. CD 6/27/51.

▲† **Ohio**—NIKE SITES—BA 3/6—U. S. Eng., New Post Office Bldg., Pittsburgh, Pa. 4 NIKE sites at Willowick, Bratenahl, Lake Front and Rocky River, Cuyahoga Co. $4,000,000-$5,000,000; remaining two sites will be advertised at later date. Extended date. CD 12/1.

† **Illinois**—BA 3/9—U. S. Eng., 420 Locust St., St. Louis 2, Mo., Rand Ave. Pumping Station and misc. related work in Wood River Drainage & Levee Dist., Proj. Item IV-B, Madison Co. CD 11/9.

† **Wisconsin**—OPERATIONS—BA On Or About 3/13—U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill., operations building addn. at each of three A. C. & W. Stations, Antigo, Osceola, and Williams Bay, Serial No. ENG-11-032-56-47.

BUILDINGS—BA

Mich., Allegan—SCHOOL—BA 2/28—Bd. Educ., Toivo E. Malila, secy., high school. Plans deposit $20. Guido A. Binda & Assoc., 231 Capitol Ave., Battle Creek, archts. CD 5/25.

Mich., Kalamazoo—DORMITORY, etc.—BA 2/28—Bronson Hospital Bd. Trustees, 252 E. Lovell St., student nurse dormitory and school facility. Plans deposit $25, refundable. Stapert-Pratt-Bulthis & Sprau, Inc., 474 Academy St., archt. CD 11/23/54.

Mich., Ann Arbor—MEDICAL AND SCHOOL OF NURSING—BA 3/13—Regents of University of Michigan, W. K. Pierpont, vice pres., Plant Service Bldg., first unit Proj. 37, medical and school of nursing bldg. University of Michigan. Plans deposit $50, refundable. Giffels & Vallet, Inc., L. Rossetti, Architects & Engineers, 100 Marquette Bldg., Detroit, archts. CD 3/4.

HEAVY CONSTRUCTION—LB & CA

▲ **McManus & McCarthy, Inc.**, 416 W. Benson St., Reading, O., LB **$1,275,510** (3 bidders) East Branch Ohio River Interceptor, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Jan. 31. CD 1/18.

C. A. Agresta Constr. Co., 4186 Greenvale St., Cleveland 21, O., LB **$228,788,** est. $247,000 (6 bidders) paving, grading, draining Rockside Rd., Maple Heights and Garfield Heights, CLEVELAND, O. Comrs. Cuyahoga Co., Court House, Cleveland, 13, O. Bids Feb. 2. CD 1/23.

▲ **George Sheaf & Co.**, 449 Neilston St., Columbus, O. and **E. P. Coady & Co.**, 960 Barnett Rd., Columbus, O. CA **$1,647,931,** expansion Jackson Pike sewage treatment plant, by installing four 170x330 ft. primary settling tanks, four 110x121 ft. pre-aeration tanks, incl. control bldgs. for each unit, COLUMBUS, O. City, City Hall, Columbus, O. CD 4/22.

▲† **George W. Timmons Co.**, 780 W. Lane Ave., Columbus, O., CA **$1,926,827,** three 2 story dormitories; enlisted mens service club; storage bldg. for fly-away kits; armament and electronics shop, Lockbourne Air Force Base, ENG-46-022-56-11, COLUMBUS, O. U. S. Eng., 237 Fourth Ave., Huntington 19, W. Va. Bids Jan. 17. CD 1/23, under LB.

Chester Products Co. Div. of Ransohoff, Inc., 50 Ford Blvd., Hamilton, O. CA Est. **$75,000,** L-shaped, 82x82 ft. swimming pool, Turner Rd., near Main St., DAYTON, O. Sherwood Forest, Inc., c/o Jay L. Donaldson, 2445 Ravenwood St., Dayton, O.

† **Luhr Bros., Inc.**, Columbia, Ill., **$50,888,** est. $56,681 (3 bidders) pressure relief wells, constr. alterations Wood River Drainage & Levee Dist., Proj. Item VI-A (5) Columbia Drainage & Levee Dist., Proj. Item V-B (1), Harrisonville & Ivy Landing Drainage Dist. and Levee Dist. Proj. Item VI-D, Fort Chartres & Ivy Landing Drainage Dist. Proj. Item II-A (4) Degognia and Fountain Bluff Levee & Drainage Dist., Proj. Item VI-B (2) and Perry County Drainage & Levee Dist. 1, 2 and 3, Proj. Item VII-A (4), Madison, Monroe, Randolph Counties, Ill. and Perry Co. Mo., CIVENG-23-065-56-48, ILLINOIS and MISSOURI—U. S. Eng., 420 Locust St., St. Louis 2, Mo. Bids Jan. 27. CD 1/5.

(Continued on page 252)

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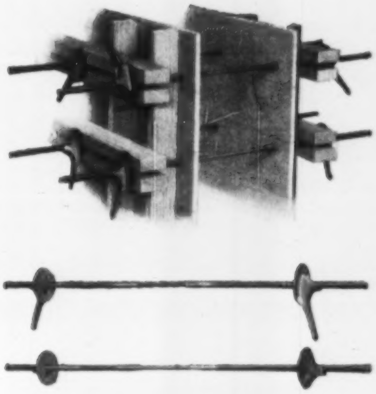
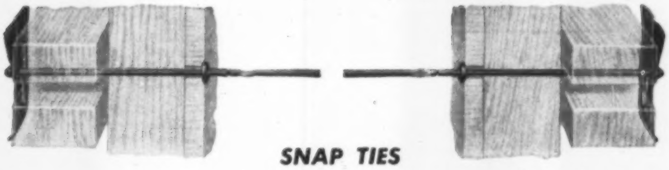
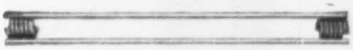


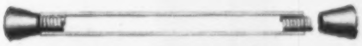
TILT LOCK CLAMPS



SNAP TIES



STANDARD COIL TIES



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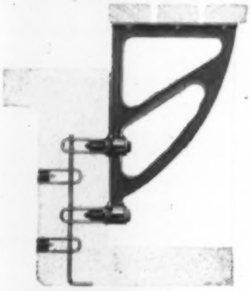
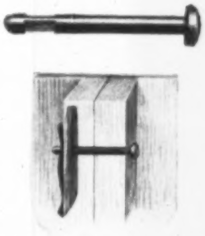


RISERFRAMES



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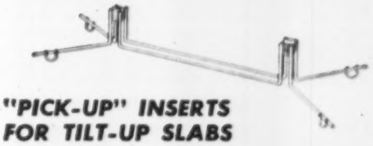

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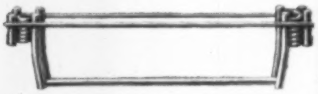

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(Continued from page 250)

Madison Constr. Co., E. Schwarz St., Edwardsville, Ill., LB **$139,054** (3 bidders) imprv. Elm St. from Alby St. to point 10 ft. east of line of State House Sq., ALTON, ILL. City, City Hall, Alton, Ill. Bids Jan. 23. CD 1/17.

Ciccione Brothers, Inc., 3858 W. Lake St., Chicago, Ill., LB **$471,885**, storm sewer, Kostner Ave. from Division St. to Armitage Ave., CHICAGO, ILL. City, City Hall, Chicago, Ill. CD 3/19/45.

American Asphalt Paving Co., 9701 S. Torrence St., Chicago, Ill., LB **$332,619**, bit. paving S. State St. 95 to 115 Sts., CHICAGO, ILL. City, City Hall, Chicago, Ill., CD 4/26/45;

Consolidated Constr. Co., 101 S. Wells St., Chicago, Ill., LB **$327,826**, bit. paving State St. and Congress Plaza (Chicago, Ill.).

† **Madison Stone Co., Inc.**, Route 1, Madison, Wis., LB **$164,905**. parking apron, taxiway, Truax Air Force Base, ENG-11-032-56-17, MADISON, WIS. U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill. Bids Jan. 13. CD 12/7.

BUILDINGS—LB & CA

▲ **Parkdale Constr. Co.**, 6917 Wilson Mills Rd., Gates Mills, O. Own Forces. **$1,750,000**. 57 HOMES, on Wilson Mills Rd. east of SOM Center Rd., MAYFIELD, O. Thomas E. Caves, 4090 Eastway, Cleveland 21, O., archt.

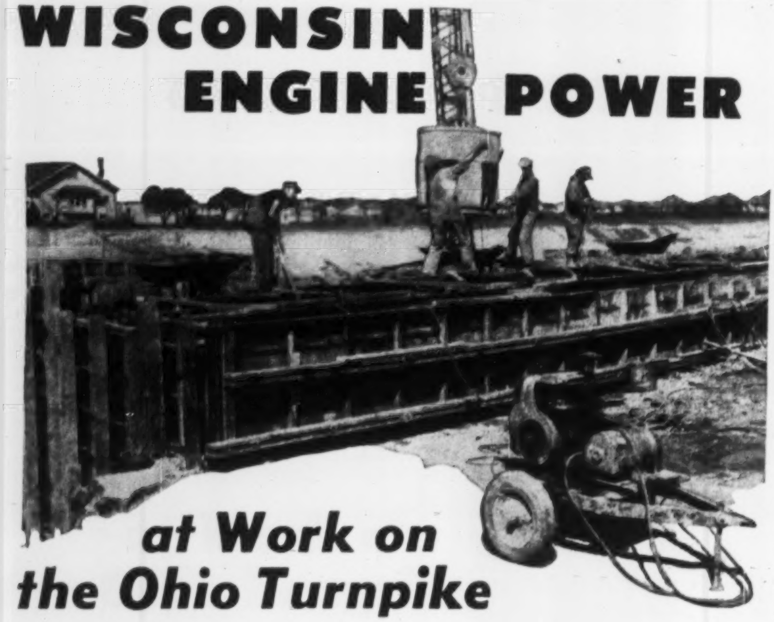
Charles Shutrump & Sons Co., 101 W. Hylda St., Youngstown, O., LB **$574,000**, general constr. (2 bidders) JAIL, OFFICE, YOUNGSTOWN, O. Mahoning County Jail & Office Bldg. Comn., Court House, Youngstown, O. Bids Jan. 31. CD 1/6.

C. A. Tharnstrom & Co., 7404 N. St. Louis Ave., Skokie, Ill., CA, **$185,000**, steel fabricating PLANT, SKOKIE, Ill. Ralston Steel Co., St. Louis and Jarves Aves., Skokie, Ill. Bids Jan. 6. CD 12/28.

Edgar Stephens & Sons, 216 10 St. Cairo, Ill., CA, **$519,929**, 1 and 2 story, 117x135 ft., 59x133 ft., 93x194 ft., brick, steel, concrete, Senior HIGH SCHOOL, 1 St. and Bellfontaine Dr., WATERLOO, ILL. Community Unit School Dist. No. 5, Monroe and St. Clair Counties, Bd. Educ., W. J. Zahrow, supt. Schools, 1 St. and Bellfontaine Dr., Waterloo, Ill. Bids Jan. 11. CD 1/18, under LB.

City, Bd. Educ., 40 Patterson St., Pontiac, Mich. rejected bids Jan. 17, elementary SCHOOL, Walton Blvd., PONTIAC, MICH. Will re-advertise. CD 12/15.

▲ **Adolph and Charles Komer**, 2905 Cadillac Tower, Detroit, Mich. Owner Builds. **$2,000,000**. 167 brick HOMES, 17-Mile Rd. and Adams St., TROY, MICH.



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WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† **Kansas**—BA 2/21—Bureau Reclamation, Dpt. Interior, Superior, Neb., clearing, Lovewell Reservoir site, Kansas River Projs., Spec. 701C-396, L. N. McClellan, Bldg. 1A, Denver Federal Center, Denver, Colo., ch. engr. CD 8/14/53.

† **Mo., Fort Leonard Wood**—BA 2/23—Post Purch. & Contg. Office, resurf. bit. roads, 147,108 sq. yd. surfacing and seal coating, Inv IFB AV—23-037-55-33. CD 2/20/52.

† **Nebraska**—BA 2/23—Soil Conservation Service, 134 S. 12 St., Lincoln, 29-NB-56, flood water and grade stabilization structure, Garner Subwatershed, near Hickman, Lancaster Co. CD 10/23/53.

Okla., Midwest City—BA 2/28—City, outfall sewer and sewage disposal plant. $300,000. Plans deposit $30. Rex Collins, McAlester, engr. CD 4/5.

† **Mont., Great Falls**—BUILDINGS—BA 3/1—U. S. Eng., City-County Airport, Walla Walla, Wash., seven 1 and 2 story, rein.-con., steel, masonry bldgs. with utilities, site development, Malmstrom Air Force Base, ENG-45-164-56-28. Plans deposit $100. Extended date. CD 1/18.

† **Colo., Denver**—BA 3/2—U. S. Eng., 1709 Jackson St., Omaha, Neb., water main, Rocky Mountain Arsenal. Over $74,000. CD 10/20/54, under Public Buildings.

Mo., St. Louis—TENNIS COURTS—BA 3/6—City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12 Blvd. and Market St., Zone 3, converting 37 clay tennis courts to all-weather courts with asph. surfaces, in 9 city parks, $125,000. CD 6/7.

Ark., Little Rock—BA 3/9—Municipal Water Works Comn., Auditorium, Little Rock, 40x60 ft., brick, concrete filter plant expansion, $125,000. Burns & McDonnell Eng. Co. 95 and Troosts Sts., Kansas City, Mo., engr. CD 1/12.

Tex., Angleton — BA 3/12 — Brazoria Co., Angleton, bridges, $75,000. Dunbar & Dickson, 224 W. 7th St., Box 1082, Freeport, engrs.

† **North Dakota**—AUTOTRANSFORMER—BA 3/20—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., one 30,000/40,000/50,000 kva. outdoor autotransformer for Grand Forks Substation, Missouri River Basin Proj., Spec. DS 4623.

† **Minn., Minneapolis**—DORMITORY, etc.—BA About 3/22—U. S. Eng., 1217 U.S. Post Office and Custom House, St. Paul, Zone 1, dormitory, gymnasium, theater, storage and other facilities, Minneapolis-St. Paul International Airport, ENG-21-018-56-10.

BUILDINGS—BA

▲ **Minn., Duluth**—HOUSING—BA 2/21—U. S. Eng., 1217 U. S. Post Office & Custom House, 180 E. Kellogg Blvd., St. Paul, Zone 1, construct and finance family housing, Duluth Air Force Base, ENG-21-018-56-11. CD 2/6, under LB.

▲ **Tex., Houston**—OFFICE—BA 2/23—Ada Oil Co., c/o K. S. Adams, Jr., 609 Hughes St., multi-story office. $3,000,000. Donald Barthelme & Hamilton Brown, 3106 Brazos St., archts. Walter P. Moore, 2 Pinedale St., and I. Naman & Asocs., 3305 Montrose St., engrs. CD 8/24.

Mo., Cape Girardeau—HOSPITAL—BA 2/24—Southeast Missouri Hospital, Bd. Trustees, Robert D. Harrison, pres., 302 Himmelberger-Harrison Bldg., 4 story, ground floor, 44x178 ft., 39x110 ft. brick, steel, concrete hospital addns., alterations, Marcel Boulicault, Ambassador Bldg., 411 N. 7 St., St. Louis, Zone 1, engr.-archt. CD 12/2, under LB.

Neb., Lincoln—SCEURITY HOSPITAL—BA 3/1—State Bd. Control, Capitol Bldg., security hospital at State Hospital. $800,000. Schaumberg & Freeman, 614 Federal Security Bldg., archts. CD 6/6/55.

BUILDINGS—SLC

Mo., St. Louis County—SCHOOL, etc.—Catholic Preparatory School for Boys, Inc., Mason Rd. between U. S. 61 and Conway Rd., Zone 24, soon lets contract 1 story, 121x129 ft., brick, concrete, steel classrooms and temporary monastery incl. alterations to existing admin. bldg. on 52 acre site south side of Conway Rd. east of Mason Rd. Raymond E. Maritz, Chemical Bldg., 721 Olive St., St. Louis, Zone 1, archt. CD 2/21/55, under Mo., St. Louis.

Mo., Shrewsbury (St. Louis 17 P. O.)—SCHOOL—St. Louis Archdiocese of Catholic Church, Most Rev. Joseph E. Ritter, archbishop, 3810 Lindell Blvd., St. Louis, Zone 8, soon lets contract 2 story, brick, steel, concrete St. Louis Preparatory High School on grounds of St. Louis Preparatory Seminary, 5200 Glennon Dr., Henry P. Hess, 4005 W. Florissant Ave., St. Louis 15, archt. Metz & Alper, 8147 Delmar Blvd., University City, Zone 24, engrs. Harry F. Wilson, 4908 Delmar Blvd., St. Louis, Zone 8, mech. engr. CD 1/6.

HEAVY CONSTRUCTION—LB & CA

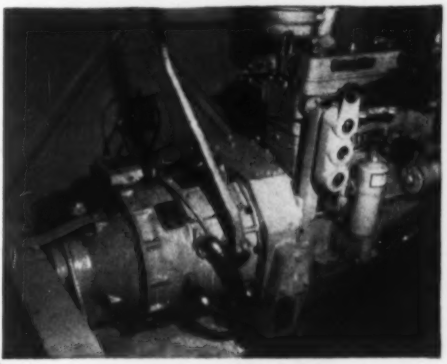
Cooper Constr. Co., Fort Dodge, Iowa, CA $72,530, Drainage District No. 181 in Sac. Calhoun, Pocahontas and Buena Vista Counties; POCAHONTAS, IOWA. Pocahontas Co., Marie Pavik, aud., Pocahontas, Iowa. Bids Jan. 20. W. C. Alto, Sac City, Iowa, engr.

▲† **Universal Constr. Co.**, 1200 S.W. Blvd., Kansas City, Kan. CA **$1,148,688**. field maintenance hangar, Grandview Air Force Base, Inv. 23-028-56-52, GRANDVIEW, MO. U. S. Eng., Federal Office Bldg., Kansas City, Mo. CD 2/1, under LB.

C & L Rural Electric Co-operative, Lynn Thomasson, mgr., Star City, Ark. Own Forces, $970,000. 120 mi.

(Continued on page 254)

Torque Converter power-packages on three cranes



Close-up of Caterpillar D315 Diesel Engine, driving through a Twin Disc Model CF Torque Converter. This powerful combination is used by the Valentine-Clark Corporation of St. Paul, Minn., to power their Link-Belt Crane, shown below.

save $60^{00} a day in *fuel* costs *alone!*

A Twin Disc Torque Converter, on each of three cranes, is saving the Valentine-Clark Corporation of St. Paul, Minn., $20 a day in fuel costs alone—or a total of $60 for all three.

This company chemically treats poles to prevent destruction by weather and insects. Logs are shipped in from the West Coast, debarked and then chemically treated. The three cranes are used to unload the logs into treating pits, and to reload them for shipment.

This equipment includes one Link-Belt and two American Hoist & Derrick Cranes—all of which are equipped with Caterpillar D315 Diesel Engines, driving through Twin Disc Model CF Torque Converters.

Each of the cranes has been converted from steam power, and since switching to the powerful diesel engine-torque converter combination, several advantages have been realized. According to Lawrence Martin, Superintendent of Valentine-Clark, "In addition to our $20 a day saving in fuel—*per crane,* we've *increased* production more than 20%. We've also *decreased* labor costs in eliminating time consumed to fire boilers, and to make water stops."

The next time you repower or purchase new equipment—*specify a Twin Disc Torque Converter* for a smoother, easier, more flexible flow of power (up to 6:1 multiplication) and for longer equipment life through cushioning of shock loads. *Your* production will *increase . . .* your costs will *decrease.* Contact your engine dealer for more information. Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.

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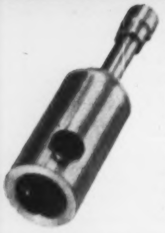

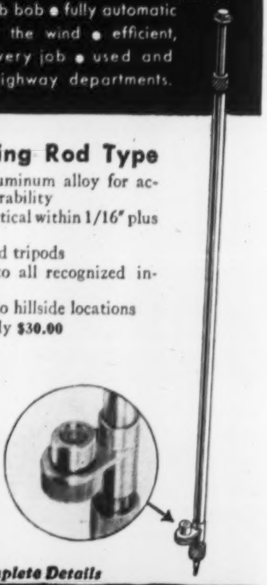

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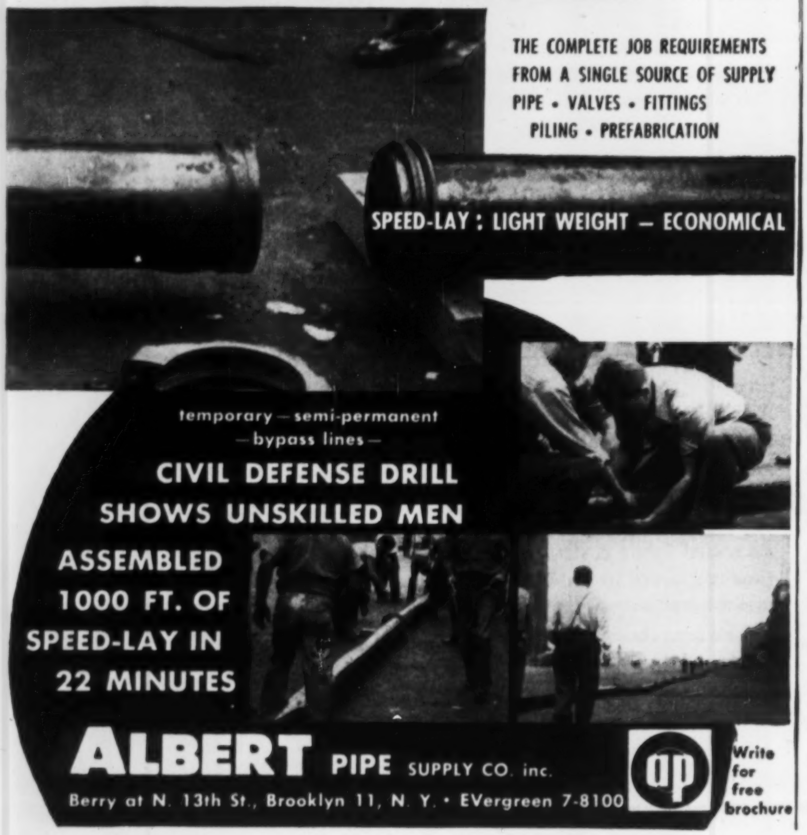

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(Co[illegible] page 252)

rural distr. lines, Lincoln Co. and sys. imprvs., **ARKANSAS.** CD 11/10.

E. W. Bacharach, Rialto Bldg., Kansas City, Mo., LB **$114,128,** est. $116,000. four filter beds filter drains, filter plant expansion, LITTLE ROCK, ARK. Little Rock Municipal Water Works Comn., City Hall, Little Rock, Ark. CD 1/12.

▲ **McCormick-Erling Co.,** Fargo, N. D., **Paul R. Kemper,** Minot, **N. D., Delzer Constr. Co.,** Bismarck, N. D., **Tri-State Excavating Co.,** 1213 NP Ave., Fargo, N. D. **LB $3,051,940.** Schedule 1, roads and utilities, Grand Forks Air Force Base, ENG-25-066-56-48, GRAND FORKS, N. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 27. CD 1/6;

Chicago Bridge & Iron Co., 332 W. Michigan Ave., Chicago, Ill., **$93,100,** Schedule II, (Grand Forks, N. D.).

† **U. S. Eng.,** 1709 Jackson St., Omaha, Neb., cancelled bids to have been opened Jan. 31, intake structure portable service elevator, Fort Randall Reservoir Proj., Pickstown, Inv. 25-066-56-85. SOUTH DAKOTA. CD 12/30.

▲† **Western Contg. Corp.,** 400 Benson Bldg., Sioux City, Iowa, LB **$5,618,750.** earthwork, Stage V, Oahe Reservoir Proj., near Pierre, Inv. 25-066-56-75, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Feb. 1. CD 1/26.

† **Korshoj Constr. Co., Inc.,** Holdrege, Neb. and **Claussen-Olson-Benner,** Holdrege, Neb. LB **$914,439, est. $786,-806.** earthwork and structures for Kirwin Canal, Sta. 706 plus 01.4 to 706 plus 75; Kirwin North Canal Sta. 706 plus 75 to end; Kirwin North Canal laterals, sub-laterals, adjacent drains, Solomon Division, Missouri River Basin Proj., Spec. DC 4587, KANSAS. Bureau Reclamation, Dpt. Interior, Kirwin, Kan. Bids Jan. 26. CD 12/6.

▲† **Bateson Constr. Co.,** 6800 Denton Dr., Dallas, Tex. CA **$2,913,700.** hospital and heating plant, Forbes Air Force Base, Inv. 23-028-56-36, TOPEKA, KAN. U. S. Eng., Federal Office Bldg., Kansas City, Mo. CD 1/20, under LB.

† **Red Arrow Sales, Inc.,** 2021 S. Hillside St., Wichita, Kan. CA **$104,537.** 4 units of Senior Quarters Proj. 15A-56 McConnell Air Force Base, IFB 14-614-56-22, WICHITA, KAN. **Purch. & Contg.** Office, McConnell Air **Force Base, Wichita, Kan. CD 2/2/**51.

† **Paul R. Moody Co., Pauls Valley,** Okla., **LB $60,908.** **est.** $65,000. **floodwater retarding structures** on Owl Creek, Washita River Watershed, near Purcell, McLain Co., Inv. SCS 15-OK-56, OKLAHOMA. Soil Conservation Service, Stillwater, Okla. Bids Jan. 30. CD 1/10.

Bell Constr. Co., Okmulgee, Okla., CA water and sewer treatment plants. Total est. **$217,000.** POTEAU, OKLA. City, City Hall, Poteau, Okla. Bids Dec. 1, CD 11/16.

Donathan & Bailey, Wilburton, Okla., CA water and sewer lines (Poteau, Okla.).

City, Alvin, Tex. Purchase and Hire. **$110,000,** 50 city blocks shelled base and black-topped streets, ALVIN, TEX. CD 12/27.

H. H. Herskill, Pampa, Tex., CA **$99,788,** 9 deep water well turbine pump units, AMARILLO, TEX. City, City Hall, Amarillo, **Tex.** Freese & Nichols, 407 Danciger Bldg., **Fort Worth, Tex.,** engrs. Bids Jan. 10. CD 3/14.

Dallas Power & Light Co., Dallas Power & Light Bldg., **Dallas, Tex.** Own Forces. **$150,000,** convert 4,000-**volt line to 13,**000 capacity, DALLAS, TEX. CD 1/3.

† **Dickey Electric Co.,** 9550 E. Ave. S., Houston, Tex. LB **$89,726,** est. $75,000, electrical distr. lines exten. ENG-41-243-56-29, ELLINGTON AIR FORCE BASE, TEX. U. S. Eng., Box 1229, Galveston, Tex. Bids Jan. 30. CD 12/30.

Ballinger Mills, Owners Representative, Post Office St., Galveston, Tex. Own Forces. **$80,000,** constr., asph. paving new streets, curb and gutter, GALVESTON, TEX.

Ballinger Mills, Owners Representative, Post Office St., Galveston, Tex. Own Forces. **$95,000,** sanitary-storm sewers, GALVESTON, TEX.

Ballinger Mills, Owners Representative, Post Office St., Galveston, Tex. Own Forces. **$45,000,** bldg. site area dirt work, grading, GALVESTON, TEX.

Ballinger Mills, Owners Representative, Post Office St., Galveston, Tex. Own Forces. **$46,000,** water lines, facilities, GALVESTON, TEX.

Spring Branch Woods Developers, 1200 Witte St., Houston, **Tex.** Own Forces. **$77,500,** open and closed drainage, HOUSTON, TEX.

Spring Branch Woods Developers, 1200 Witte St., Houston, **Tex.** Own Forces. **$75,000,** concrete paved streets, curb and gutter, HOUSTON, TEX.

Spring Branch Woods Developers, 1200 Witte St., Houston, Tex. Own Forces. **$45,000,** water lines, facilities, HOUSTON, TEX.

Spring Branch Woods Developers, 1200 Witte St., Houston, Tex. Own Forces. **$75,000,** sanitary sewers, HOUSTON, TEX.

Watonga Corp., 7809 Brykerwoods St., Houston, Tex. Own Forces. **$77,500** hard paved streets, HOUSTON, TEX.

Watonga Corp., 7809 Brykerwoods St., Houston, Tex. Own Forces. **$45,000,** c.i. water lines, HOUSTON, TEX.

Watonga Corp., 7809 Brykerwoods St., Houston, Tex. Own Forces. **$90,000,** sanitary-storm sewers, HOUSTON, TEX.

H. H. Miller, 608 Kenwood St., Dallas, Tex., LB **$131,-516,** est. $110,000, water and sanitary sewer lines, IRVING, TEX. City, Irving, Tex. Bids Jan. 26.

† **Goebel-Scott Corp.,** Box 6545, Alamo Heights Station, San Antonio, Tex., LB **$158,754,** est. $200,000.

correction of drainage deficiencies, **ENG-41-243-56-36**, LACKLAND AIR FORCE BASE, **TEX. U. S. Eng.**, Box 1229, Galveston, Tex. Bids **Feb. 3.**

† **C. L. Browning, Jr.**, Box 5008, **Beacon Hill Sta., San** Antonio, Tex., LB **$181,052, addnl. facilities**, landing strip and taxiway, ENG-41-243-56-28, MEDINA BASE, TEX. U. S. Eng., Box 1229, Galveston, Tex, Bids Jan. 12.

† **Warner Constr. Co.**, Box 769, San Angelo, Tex. CA **$879,040**, est. $500,000-$1,000,000 dining hall and 2 dormitories, total 66,165 sq. ft. masonry constr., Goodfellow Air Force Base, ENG-41-443-56-54, SAN ANGELO, TEX. U. S. Eng., 100 W. Vickery Blvd., Fort Worth, Tex. Bids Jan. 10. CD 1/16, under LB.

† **H. Halverson, Inc.**, E. 218 Sharpe St., Yardley, Wash. **CA $274,903**, est. $273,865. exchange sales store bldg., Malmstrom Air Force Base, Inv. 56-26, GREAT FALLS, MONT. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids Jan. 31. CD 1/4.

▲† U. S. Eng., City-County Airport, **Walla Walla**, Wash. rejected bids Dec. 15. 134,500 sq. yd. c. conc. apron paving, utilities at Malmstrom Air Force Base, ENG-45-164-56-18, GREAT FALLS, MONT. LB **$2,296,311**. New bids in February. CD 12/20, under LB.

A. H. Read Co., 706 W. 19 St., Cheyenne, Wyo., CA **$419,762**, installing storm sewers and appurtenant structures, street grading, curb and gutter, RAWLINGS, WYO. City, City Hall, Rawlins, Wyo. Bids Jan. 24, awarded Jan. 30. CD 1/18.

COLORADO—State Hy. Dpt., 4201 E. Arkansas St., Denver,

Graham Constr. Co., 1509 E. 17 St., Pueblo, Colo., CA **$388,629**, est. $410,000. grading, stab. road mix asph. surf., major structures 2.34 mi. UI 002-3 (II) Unit 1 and FI 002-3 (12), Pueblo Co. Bids Feb. 1. CD 1/24.

Hammond Iron Works, Provo, Utah, CA **$68,920**. aboveground water storage tank, STERLING, COLO. City, City Hall, Sterling, Colo. Bids Jan. 30. CD 10/6.

† **NEW MEXICO**—Bureau P. Rds., Dpt. Commerce, U. S. Court House, Santa Fe,

G. I. Martin, 400 California St. S. E., Albuquerque, N. M. CA **$255,476**. constr. Forest Hy. 3.939 mi., Proj. 37-A2, B2, Otero Co. Bids Jan. 26, awarded Jan. 30. CD 1/23.

BUILDINGS—LB & CA

Worthington Corp., 807 13 Ave. S., Minneapolis, Minn. LB **$98,356** (1 bidder) condenser and turbine, ANOKA, MINN. State, Dpt. Admin., P. T. Peterson, dir. Purchases, 19 State Capitol, St. Paul, Minn. Bids Jan. 26. CD 12/29.

Viking Constr. Co., 5948 Pleasant Ave., Minneapolis, Minn. LB **$557,800** (5 bidders) general contract superstructure of Black Dog School, BURNSVILLE, MINN. Bd. Educ., Joint Consolidated School Dist. No. 15, J. Metcalf, supt., Shakopee, Minn. Bids Jan. 31. CD 1/18.

▲ **U. S. Eng.**, 1217 Post Office & Custom House, St. Paul, Minn., rejected bids Jan. 27, family housing and exterior work, Duluth Air Force Base, Inv. ENG-21-018-56-6, DULUTH, MINN. LB **$1,637,800**. Will re-advertise. CD 2/1, under LB.

† **J. S. Alberici Constr. Co., Inc.**, 1550 Irving Ave., St. Louis 20, Mo. LB **$136,838**. MAGNESIUM BLDG. (Sub-contract WS 31) for Atomic Energy Comn., WELDON SPRINGS, MO. Fruin Colnon Contg. Co. & Utah Constr. Co., joint ventures, St. Louis Area Proj. Contr. AT (40-1) 1966, P. O. Box 522, St. Charles, Mo. Bids Jan. 31. CD 1/10.

William Welfi & Son, Yankton, S. D., CA **$409,900**. general constr. business ADMINISTRATION BLDG. at State University, VERMILLION, S. D. State Bd. Regents, Pierre, S. D. Bids Jan. 20. CD 1/9.

Westcott-Bowen Constr. Co., 1734 "R" St., Lincoln, Neb. LB **$424,972**, general constr. BIOCHEMISTRY-NUTRITION BLDG., LINCOLN, NEB. University of Nebraska, 12 and "R" Sts., Lincoln, Neb. Bids Jan. 24. CD 1/5.

▲ **Elmdale Development Corp.**, 803 Schweiter Bldg., Wichita, Kan. Owner Builds. **$2,000,000**. 275 DWELLINGS, JUNCTION CITY, KAN. L. E. Wells, 1810 E. 13 St., Wichita, Kan., archt.

Maxwell Constr. Co., Baytown, Tex., LB **$719,261**, est. $736,000, HIGH SCHOOL PLANT and G. W. Carver SCHOOL addn., ANAHUAC, TEX. Anahuac Independent School Dist., Anahuac, Tex. Bids Jan. 26. CD 1/19.

Gray & Becker, 4901 Strass St., Austin, Tex. Day Labor, **$350,000**, 149-unit MOTOR HOTEL, AUSTIN, TEX. CD 1/18.

Tynes & Burck, Fidelity Union Life Bldg., Dallas, Tex. Own Forces. **$357,500**, 36 frame DWELLINGS, DALLAS, TEX. CD 12/27.

Bloomington Independent School Dist., Bloomington, Tex. rejected bids Jan. 12, HIGH SCHOOL, BLOOMINGTON, TEX. LB **$728,786**, est. $750,000. New Bids Feb. 9. Herbert E. Kellner, 406 Austin Hy., San Antonio, Tex., archt. R. C. Rippstein, Tranist Tower, and E. B. Harben, 123 Downing St., San Antonio, Tex., engrs. CD 1/19, under LB.

R. L. Bradley & A. E. Bailey, 7445 Park Place Blvd., Houston, Tex. Own Forces. **$390,000. 40 DWELLINGS; $350,000**, 35 DWELLINGS, HOUSTON, **TEX. CD 1/16.**

Melburn Corp., C. H. Murray, pres., **7603 Belgard St.,** Houston, Tex. Own Forces. **$345,000**, 30 DWELLINGS; **$360,000**, 31 DWELLINGS, HOUSTON, TEX. CD **1/18.**

▲ **Schneider Constr. Co.**, 3004 W. Dallas St., Houston, Tex., CA **$1,944,286**, constr. RESIDENTIAL COLLEGES, HOUSTON, TEX. Rice Institute, 6100 Main St., Houston, Tex. Bids Jan. 6. CD 1/20, under LB.

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Wm. H. Craig, c/o Craig Realty Co., 4510 Elm St., Houston, Tex. Own Forces. **$345,000,** 23 DWELLINGS, HOUSTON, TEX. CD 12/14.

▲ **Melton Constr. Co.,** Mesquite, Tex. Own Forces. **$355,550,** 35 DWELLINGS; **$347,760,** 33 DWELLINGS; **$386,225,** 40 DWELLINGS, MESQUITE, TEX. Grand total $1,089,535. CD 11/30.

▲ **E. W. Hayes,** Colorado Springs, Colo., Owner Builds, **$200,000,000,** 15,000 HOME DEVELOPMENT, COLORADO SPRINGS, COLO. Harman, O'Donnell & Henninger, Broomfield, engrs.

▲ **Abe Perlmutter Constr. Co.,** 401 Vallejo St., Denver, Colo., LB, **$1,298,000.** 180,110 sq. ft. concrete block, glass SHOPPING CENTER, LAKEWOOD, COLO. Jewish Consumptive Relief Society, 1616 Equitable Bldg., Denver, Colo. Bids Jan. 27. CD 1/12/54.

FAR WEST

HEAVY CONSTRUCTION—BA

† **Nev., Hawthorne**—BA 2/29—Dist. P. Wks. Office, 12th Naval Dist., San Bruno, Calif., development water supply sys., Naval Ammunition Depot, NOY 91732, Spec. 50137. Plans deposit $25.

† **Washington**—BA 3/6—Bureau Reclamation, Dpt. Interior, Ephrata, Evergreen Pumping Plant Block 77, Columbia Basin Proj., near Quincy, Spec. DC 4630, adv. ENR 2/16.

† **Washington**—UTILITIES, etc.—BA 3/7—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, clearing, grading, utilities and constr. buildings and underground structures at 4 different locations in vicinity of Fairchild Air Force Base, ENG-45-108-56-134. Plans deposit $100.

† **Washington**—BA 3/20—Bureau Reclamation, Dpt. Interior, Ephrata, earthwork, structures for Part 4 Block 18 laterals, wasteways and drain, East Low Canal laterals, Columbia Basin Proj., near Mesa, Spec. DC 4625, adv. ENR 2/16.

BUILDINGS—BA

Calif., Riverside—FIRE STATION—BA 2/24—City, City Hall, 19,000 sq. ft., reinforced-brick, main fire station, $350,000. Plans deposit $25. Bolton Caldwell Moise Jr., 3514 9 St., Riverside, archt. CD 9/16/52.

Calif., El Centro—HOSPITAL—BA 3/7—City, City Hall, 1 story, 44-bed, concrete hospital. $500,000. Plans deposit $50. Frank C. Hyde, Professional Bldg., archt.

BUILDINGS—SLC

Wash., Moses Lake—HOTEL—V. O. Stringfellow, 2017 W. 57 St., Seattle, soon lets contract, 3 story rein.-con. hotel. $750,000. J. W. Maloney, Central Bldg., Seattle, Zone 4, engr. CD 11/7.

HEAVY CONSTRUCTION—LB & CA

R. W. Colman, 3548 Washington Blvd., Ogden, Utah, LB **$416,661.** water distr. lines, Sect. No. 2, Davis Co., OGDEN, UTAH. Weber Basin Water Conservancy Dist., E. J. Fjeldsted, 506 Kiesel Bldg., Ogden, Utah, Templeton & Linke, 500 Dooly Bldg., Salt Lake City, Utah, engrs. Bids Jan. 10. CD 12/18/52.

Arizona Sand & Rock Co., P. O. Box 959, Phoenix, Ariz., CA, **$74,347,** paving various streets in subdivision bounded by Central Ave. on east, 7 Ave. on west, Bethany Home Rd. on north and Sam Miguel on south, PHOENIX, ARIZ. Rancho Solano Imprvt. Dist., Phoenix, Ariz.

▲† **M. M. Sundt Constr. Co.,** 440 S. Park St., Tucson, Ariz., CA **$2,649,957,** est. $2,500,000. apron and runway exten., Davis-Monthan Air Force Base, ENG-04-353-56-80, TUCSON, ARIZ. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 27, awarded Jan. 31. CD 2/1, under LB.

† **Cherf Brothers, Inc. & Sandkay Contractors, Inc.,** Ephrata, Wash., CA **$57,313,** earth, concrete lining for fifth section of East Low Canal, Station 3496-plus 60 to 3529 plus 00, Columbia Basin Proj. Spec. 117C-350, WASHINGTON. Bureau Reclamation Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. L. N. McClellan, c/o owner, ch. engr. Awarded Jan. 25.

WASHINGTON—State Hy. Comn., Olympia,
Wash.—**Associated Sand & Gravel Co.,** 2508 Colby St., Everett, Wash., LB, **$82,340,** (3 bidders) grading, surf. b. conc. paving, precast concrete bridge 2.258 mi. Getchell Rd. FAS S-0318 (2), Snohomish Co.;
Wash.—**D. A. Sullivan,** Parkwater, Wash., LB, **$78,153,** (7 bidders) bit. surf. 7.604 mi. Taylor Flats Rd. and Feeder Road 19-18, FAS S-1033 (3), Franklin Co.;
Wash.—**Wilder Constr. Co.,** Bellingham, Wash., LB, **$396,658,** (6 bidders) surf., cement-treated base and b. conc. 2.535 mi. Primary State Hy. 1, Conway Junction to Rickox Rd. FAP BFI-001-5 (2) Unit 3, Skagit Co. Bids Jan. 31. CD 1/18.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,

E. L. Yeager, Box 87, Riverside, Calif., LB **$459,940,** est. $575,000. (8 bidders), surf., plant mix, 2 bridges between C Ave. and Graham St., Riverside Co. Bids Feb. 2. CD 1/11.

CALIFORNIA—State Div. Hys., 1120 N St., Sacramento,
Calif.—**Richards-Underdown Co.,** 355 Thorne Ave., Fresno, Calif., LB **$318,361,** grading, surf. about 2.3 mi. Sign Rte. 41 between Shields Ave. in Fresno and 0.3 mi. north of Shaw Ave. in Fresno Co.;

Calif.—**L. B. Wells Constr. Co.,** 2 Ave. South, Vidalia, Calif., LB **$83,867,** (6 bidders) grading, surf. 2 mi. FAS Rte. 1212, Tulare Co. Bids Feb. 1. CD 1/11.

† **J. A. McNeil & Ukropina, Polich, Kroll,** 3115 W. Mission St., Alhambra, Calif., CA **$892,848,** tactical and administrative facilities, AAA site LA 29-C and LA 29-L, Los Angeles Co., ENG-04-353-56-77, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 26, awarded Jan. 27. CD 2/1, under LB.

† **Ray. Wilson Co.,** 2960 Marsh St., Los Angeles, Calif., CA, **$948,966,** est. $1,000,000. tactical and administrative facilities, AAA Sites, LA 88-C and LA 88-L, Los Angeles Co., ENG-04-353-56-70, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 20, awerded Jan. 25. CD 1/26, under LB.

† **Clyde W. Woods & Sons, Inc.,** Box 620, North Hollywood, Calif., CA **$625,900,** est. $750,000. Los Angeles River imprvs., Los Angeles Co., CIVENG-04-353-56-20, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 18, awarded Jan. 30. CD 1/25, under LB.

Dakan Eng. Co., 3059 W. Valley Blvd., Alhambra, Calif., LB **$148,650.** swimming pool and bathhouse, CALEXICO, CALIF. City, City Hall, Calexico, Calif. Bids Jan. 17. CD 1/6.

Albert Oberg, 2106 W. 95 St., Los Angeles, Calif., LB, **$92,123,** est. $100,000 (4 bidders) imprv. 6 St. Viaduct over Los Angeles River, LOS ANGELES, CALIF. City, City Hall, Los Angeles, Calif. Bids Jan. 25. CD 1/5.

Charles T. Brown Co., 1955 Glenoaks Blvd., San Fernando, Calif., LB **$348,206,** est. $400,000 (6 bidders) Proj. (190) Old Mill Rd.-Los Robles Ave. storm drain and Line A, Unit 1, Granada Storm drain (Proj. 236), Pasadena and San Marino, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids Jan. 27. CD 1/5.

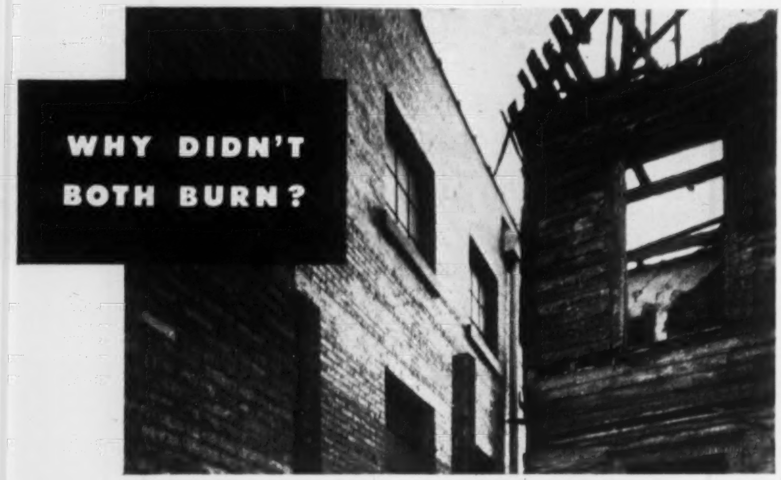
† **Allison Honer Co.,** 312 N. Main St., Santa Ana, Calif., LB **$282,458,** organizational maintenance shop, ENG-04-353-56-58, MARCH AIR FORCE BASE, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 26. CD 1/9.

† **Lindgren & Swinerton,** 1631 Beverly Blvd., Los Angeles, Calif., CA **$662,663,** est. $500,000. airmens dormitories, ENG-04-353-56-49, MARCH AIR FORCE BASE, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Dec. 22, awarded Jan. 31. CD 1/4, under LB

† **Stolte, Inc.,** 8451 San Leandro Ave., Oakland, Calif., CA, **$770,078,** airmen's club and NCO club, ENG-04-353-56-57, MARCH AIR FORCE BASE, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 19, awarded Jan. 26. CD 1/25, under LB.

† **James Stewart,** 411 N. Central Ave., Phoenix, Ariz., LB **$185,132,** est. $150,000 (6 bidders) Base Chapel No. 3, Edwards Air Force Base, ENG-04-353-56-50, MUROC, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Feb. 2. CD 1/9.

(Continued on page 258)



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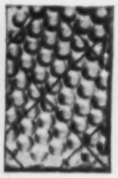
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(Continued from page 256)

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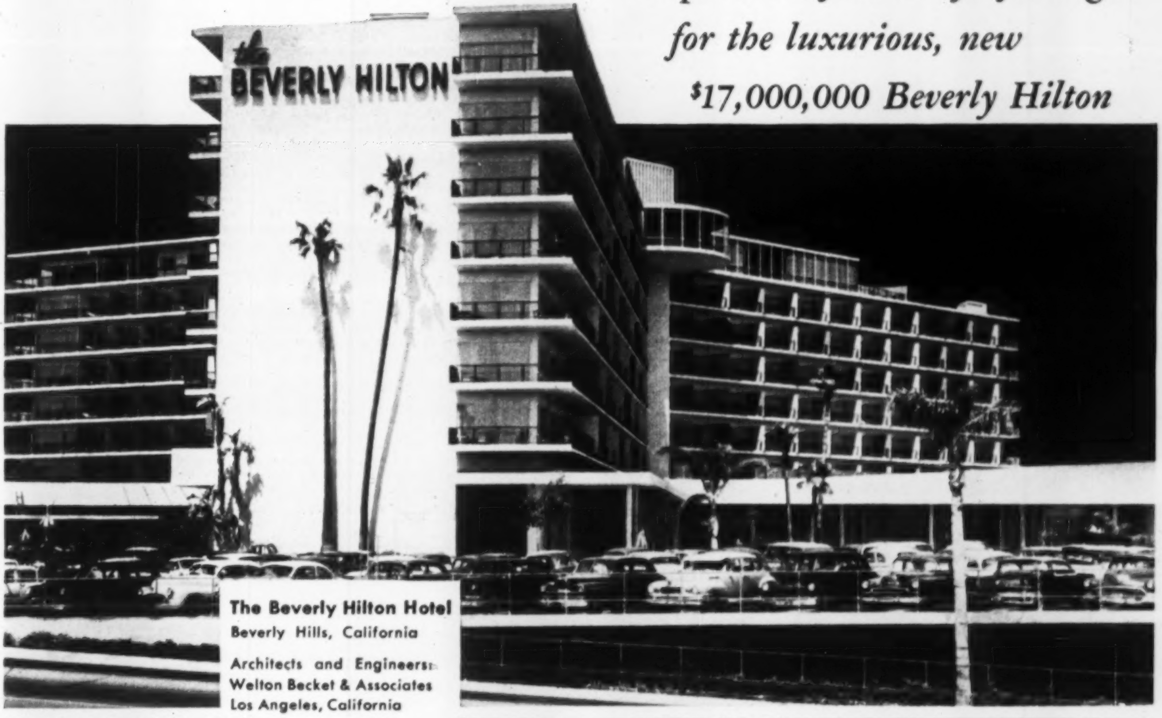

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General Contractors:
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(Continued from page 256)

N. P. Van Valkenburg Co., 8609 San Vicente Ave., South Gate, Calif., LB **$280,648**, est. $300,000. (11 bidders), Unit B, water distr. sys., SAN MARCOS, CALIF. San Marcos County Water Dist., San Marcos, Calif. Bids Jan. 31. CD 1/13.

Western Art Stone Works, 5726 Westminister Ave., Westminster, Calif., CA **$109,000**, mausoleum wing and addn., VALLEJO, CALIF. Donald L. Meyers, Locust Dr., Vallejo, Calif.

BUILDINGS—LB & CA

Brennan Constr. Co., Pocatello, Idaho, LB, **$401,400**, general contract, 32,870 sq. ft. Elementary SCHOOL TWIN FALLS, IDAHO. School District 411, Twin Falls, Idaho. Bids Jan. 26. CD 1/12.

▲† **Fanderlik-Locke Co. & Myer Brothers**, 31 South Oak Knoll Ave., Pasadena, Calif., LB **$2,486,079**, (8 bidders) Group "A" family HOUSING, ENG-04-353-56-82, FORT HUACHUCA, ARIZ. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Feb. 2. CD 1/20.

▲ **Kitchell Phillips Contractors, Inc.**, 1706 W. Buchanan St., Phoenix, Ariz., CA Est. **$3,000,000**. 105,000 sq. ft. PLANT for military electronics engineering, research and production, PHOENIX, ARIZ. Motorola, Inc., 4545 W. Augusta Blvd., Chicago, Ill. Edward L. Varney, 221 E. Camelback Rd., Phoenix, Ariz., archt. CD 2/6.

A. G. Homann, Lacey, Wash.,., CA **$562,285**, general contract JUNIOR HIGH SCHOOL, OLYMPIA, WASH. School Dist. No. 1, 116 N. Columbia St., Olympia, Wash. Bids Dec. 21. CD 12/29, under LB.

O. D. Keene Constr. Co., Walla Walla, Wash., CA **$356,636** (7 bidders) 3 story, 57x180 ft. masonry LIBRARY, WALLA WALLA, WASH. Whitman College, Walla Walla, Wash. Bids Jan. 27. CD 1/9.

Andersen & Westfall, 2470 N.W. Nicolai St., Portland, Ore., Owner Builds. **$530,000**. WAREHOUSE, PORTLAND, ORE. John F. Jensen, 2266 N.W. Lovejoy St., Portland, Ore., archt. Awarded Jan. 30.

Wm. Rohrbacher, 116 W. Third St., Santa Ana, Calif., CA, **$930,315**, elementary SCHOOL, ANAHEIM, CALIF. Magnolia School Dist., Anaheim, Calif., Bids Jan. 6. CD 12/21.

† **Quiller Constr. Co.**, 8374 W. 3 St., Los Angeles, Calif., LB **$192,000** (7 bidders) central dry provisions and cold storage PLANT, Marine Corps. Supply Center, NOY 90825, Spec. 49502, BARSTOW, CALIF. Eleventh Naval Dist., San Diego, Calif. Bids Jan. 31. CD 1/9.

Homes of Merit, 9054 E. Garvey Ave., San Gabriel, Calif., Owner Builds, **$555,260**, 50 frame, stucco DWELLINGS, Heathdale, Cragmont, and Glenfinnan Sts., COVINA, CALIF. CD 9/2.

▲ **Lindgren & Swinerton**, 1631 Beverly Blvd., Los Angeles, Calif., LB, **$1,083,000**. large INDUSTRIAL PLANT and OFFICE, FULLERTON, CALIF. Moore Business Forms, Inc., 1001 S. Hope St., Los Angeles, Calif. Bids Jan. 25. CD 1/9.

Morley Building Co., 7700 Sunset Blvd., Los Angeles, Calif., CA, **$832,000**. concrete BANK, GLENDALE, CALIF. Fidelity Saving & Loan Assoc., 215 E. Broadway, Glendale, Calif. Bank Bldg. & Equipment Co., 1200 W. 5 St., Los Angeles, Calif., archt.

B. Moore & K. Koll, 6140 S. La Cienega St., Los Angeles, Calif., CA, **$402,000**, 45 frame, stucco DWELLINGS, Markton St. and Mitter Ave., LOMITA, CALIF. Ken-Mor Contr. Co., 6140 S. La Cienega St., Los Angeles, Calif.

▲ **Gust K. Newburg Constr. Co.**, 2800 Snowden Ave., Long Beach, Calif., CA **$3,806,340**. Lakewood SENIOR HIGH SCHOOL, Lakewood, LONG BEACH, CALIF. Bd. Educ., 715 Locust Ave., Long Beach, Calif. Bids Jan. 27, awarded Jan. 30. CD 2/1, under LB.

Carter-Mack Builders, Inc., Box 457, Harbor City, Calif., LB **$364,000**, (5 bidders) Gompers Junior High SCHOOL, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Jan. 27. CD 1/19.

▲ **Wm. P. Neil Co., Ltd.**, 4814 Loma Vista Ave., Los Angeles 58, Calif., CA Est. **$6,000,000** with equip. two FACTORY building addns., LOS ANGELES, CALIF. B. F. Goodrich Co., 5400 E. Olympia Blvd., Los Angeles, Calif. Bids Jan. 15. CD 11/18.

▲ **Murphy Brothers**, 3701 E. Foothill Blvd., Pasadena, Calif., CA, **$1,005,000**, 67 frame, stucco DWELLINGS, Don Benito Court, Edgeview Dr. and Michillinda Blvd., PASADENA, CALIF. Loffiita Square Corp., 3701 E. Foothill Blvd., Pasadena, Calif. CD 4/1.

Joseph C. Klapper, 11029 S. Fair Oaks Ave., Pasadena, Calif., LB, **$423,492**, Orange Ave. SCHOOL, PUENTE, CALIF. Hudson School Dist., 15839 E. Rowland Ave., Puente, Calif. Bids Jan. 25, CD 1/16;
Wadley Constr. Corp., 5452 Pomona Blvd., Los Angeles, Calif., LB, **$392,987**, Newton St. School (Puente, Calif.)

Hoefer Constr. Co., 16645 Orange Way, Fontana, Calif., LB, **$436,780**, est. $500,000 (7 bidders) Sierra Junior High SCHOOL RIVERSIDE, CALIF. Riverside City School Dist., 3954 12 St., Riverside, Calif. Bids Jan. 24. CD 1/12.

Southern California Gas Co., 810 S. Flower St., Los Angeles, Calif., Owner Builds. **$450,000**. two 67x112 ft., concrete, steel OFFICE BLDGS., SAN BERNARDINO, CALIF. CD 11/16.

Curlett Constr. Co., 1704 W. 1 St., Santa Ana, Calif., CA, **$430,124**, 37 frame, stucco DWELLINGS, Ganado Rd. and Galano Way, SAN JUAN CAPISTRANO, CALIF. San Juan Park, 1704 W. 1 St., Santa Ana., Calif. L. C. Major & Assoc., 11015 Paramount Bldg., Downey, Calif., archts.

Reynolds Constr. Co., 55 Mountain View Ave., Santa Rosa, Calif., CA **$475,000**. 1 story, 64-bed specialized HOSPITAL, SANTA ROSA, CALIF. Owner, c/o Del-Camop & Fruiht, 5151 Neuranga Ave., Santa Rosa, Calif. John E. Brown, 700 Montgomery St., San Francisco, Calif., engr.

CANADA

BUILDINGS—BA

Man., Winnipeg—PHYSICAL TRAINING—BA 3/1—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. 1 story, partial bsmnt., 164x300 ft., rein.-con., structural steel, concrete block, brick physical training bldg. Over $350,000. Plans deposit $100. CD 3/3/54.

HEAVY CONSTRUCTION—SLC

Ont., Windsor—Economy Home Builders, 1325 Grand Marais Rd., soon lets contract storm and sanitary sewers in Chappell St. and Malden Rd. for new subdivision. $100,000. C. G. R. Armstrong, Bartlett Bldg., engr.

HEAVY CONSTRUCTION—LB & CA

Waterloo County Council, County Bldgs., Kitchener, Ont. Own Forces, **$287,000** road constr., **$238,000** maintenance, **$285,000** new Blair Bridge and approaches KITCHENER, ONT. Grand Total $810,000. J. Jordan, County Bldgs., Kitchener, Ont., co. engr.

S. McNally & Sons Ltd., 2200 King St. E., Hamilton, Ont., LB **$496,865**, (5 bidders) 36 in. water main in Lawrence Ave. from Jane St. to Royal York Rd., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St., Toronto, Ont. CD 5/18.

Canadian General Electric Co. Ltd., 212 King St. W., Toronto, Ont., LB **$305,850** (3 bidders) supplying, supervision of installation of electrical equip., incl. 13.2 kv outdoor unit sub-station power transformers, etc. John St. Pumping Station, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Jan. 30. CD 1/6.

▲ **Rayner Constr. Ltd.**, 29 Commercial Rd., Toronto, Ont. LB **$1,479,431** (6 bidders) four 100 ft. diam. digestor tanks and control bldgs., gas control sys., incl. 60 ft. diam. gas holder and gas control bldg. and appurtenances, Ashbridge's Bay Sewage Treatment Plant, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. East, Toronto, Ont. Bids Jan. 30. CD 2/28.

Eastern Canada Steel & Iron Works Ltd., Lesage Ave., Quebec City, Que., CA, **$168,450**. supplying, fabrication, erection 160 ft. span hangar, Bagotville Air Force Base, BAGOTVILLE, QUE. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Jan. 12, awarded Jan. 20. CD 12/14.

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North Shore Constr. Co. Ltd., 660 St. Catherine St. W., Montreal, Que., CA, **$297,090.** three bridges at undefined military project, CASEY, QUE. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Awarded Jan. 13.

BUILDINGS—LB & CA

Finley W. McLachlan Ltd., 195 Fairbanks St., Toronto, Ont., CA, **$750,000,** 1 story, 150,000 sq. ft., concrete block, steel PLANT and offices, TORONTO, ONT. Dominion Paper Box Co., Ltd., 469 King St. W., Toronto, Ont.

Walter G. Hunt Co. Ltd., 12405 Bishop St., Montreal, Que., CA, **$230,000,** est. $275,000 (7 bidders) 157x220 ft. PLANT, with 87x98 ft. OFFICES above, rein.-con., structural steel, brick, block, MONTREAL, QUE. Vapor Car Heating Co. of Canada Ltd., 3839 Courtrai St., Montreal, Que. Bids Jan. 18, awarded Jan. 25. CD 1/13.

Purdy & Henderson Co., Ltd., 1499 Bishop St., Montreal, Que., CA **$110,000,** 1 story, 17,500 sq. ft. rein.-con., structural steel FACTORY and OFFICES, Devonshire Rd., MONTREAL, QUE. Industrial Realty Corp., 1499 Bishop St., Montreal, Que.

ALASKA

BUILDINGS—BA

Alaska—POWER PLANT MECHANICAL EQUIPMENT, etc.—BA 2/24—At office G. E. Wieland, engr. Arcade Bldg., Seattle 1, Wash., furnish, install mechanical and electrical equip. in $2,800,000 addn. to Knik Arm Power Plant, Anchorage, for Chugach Electric Assn., Anchorage, Alaska. Plans deposit $100. CD 7/21, under Earthwork, etc.

† **Alaska, Ketchikan**—HIGH SCHOOL—BA 3/7—Alaska P. Wks., Dpt. Interior, 123 W. 3 St., Juneau, 7,744 sq. ft. steel, frame, high school addn., rein.-con. fdn., Proj. 50-A-233. Plans deposit $25. W. A. Johnson & Assocs., N. Broadway, Everett, Wash., archts. CD 11/12/51.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **India**—TRANSMISSION LINES—BA 3/22—Director of Industries and Central Purchasing Officer, Old Custom House Yard, Bombay, Zone 1, Tender No. 71, power transmission lines, Koyna Hydroelectric Proj. Est. $5,362,140.

▲ **India**—TRANSFORMERS, etc.—BA 3/26—Director of Industries and Central Purchasing Officer, Old Custom House Yard, Bombay, Zone 1, Tender No. 70, supply and erection of power transformers, Koyna Hydroelectric Proj. Est. $2,312,520.

Ceylon—SUB-STATION—BA 4/4—The Chairman, Tender Board, Ministry of Transport & Works, Transworks House, Colombo, supply of materials and labor and entire constr. and maint. during specified period of one 33/11 kv. 25,000 kva sub-station in Colombo. CD 11/20/51.

Saudi Arabia—RAILROAD—BA 9/12—Ministry of Finance & National Economy, Jeddah, Saudi Arabia, constr. Riyadh-Medina-Jeddah Ry. with its four branch lines. Plans deposit $168. Extended date. Plans available Saudi Arabian Embassy, 2800 C Woodland Dr., N. W., Wash., D. C., U. S. A. CD 12/29.

PROPOSED PROJECTS

WATER SUPPLY

Calif., Redwood City—City, City Hall, bond election Apr. 10, two reservoirs at Sequoia Reservoir site, **$500,000**. Lawrence G. Brian, P. O. Box 1001, consult. engr. CD 11/11.

▲ **Mo., Kansas City**—City, City Hall, voted **$25,000,000** bonds, Jan. 24, water supply. CD 12/28.

▲ **N. Y., West Seneca**—Town, Sewer Dist. 13, mains and lines for Ebenezer East Seneca along Orchard Park Rd. and pumping stations. **$2,404,000**. CD 11/29/45.

▲ **Tex., Dallas**—City, City Hall, voted bonds January 31, WW. **$14,250,000**. CD 1/6.

B. C. Kitimat—Municipality, Municipal Hall, WW extens., incl. installing fourth pump second m.g. reservoir, sys. addns., Neighborhoods B and C. **$745,000**.

SEWERS, WASTE DISPOSAL

▲ **Ala., Gadsden**—City, City Hall, sewerage sys. imprv. and enlargement, **$2,500,000**; storm sewers, **$1,000,000**. CD 1/23/51.

Ill., Peoria—Peoria Sanitary Dist., foot of Darst St., sanitary sewerage sye., Sheridan Rd. and Northmoore Rd. Area, **$500,000**. CD 1/9/51.

▲ **Mich., Pontiac**—Oakland Co., Ralph A. Main, drain comr., 1 Lafayette St., 12-town Drain Proj. Berkley, Ferndale, Royal Oak, Royal Oak Twp., Troy, Southfield, Pleasant Ridge, Clawson, Hazel Park, Huntington Woods, Birmingham, Oak Park, **$30,000,000**, Hubbell, Roth & Clark, Inc., 954 N. Hunter Blvd., Birmingham, McNamee Porter & Seeley, 306 State Savings Bank Bldg., Ann Arbor, and Pate & Hirn, 532 Michigan Bldg., Detroit, consult. engrs. CD 10/29/54.

Ore. Portland—City, City Hall, sewers. **$925,000**. L. G. Apperson, c/o owner, engr.

▲ **Ore., Roseburg**—City, sewers, **$625,000**. sewage plant, **$475,000**. John Loosley c/o owner engr.

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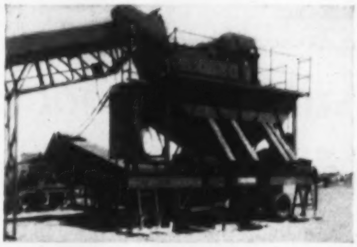

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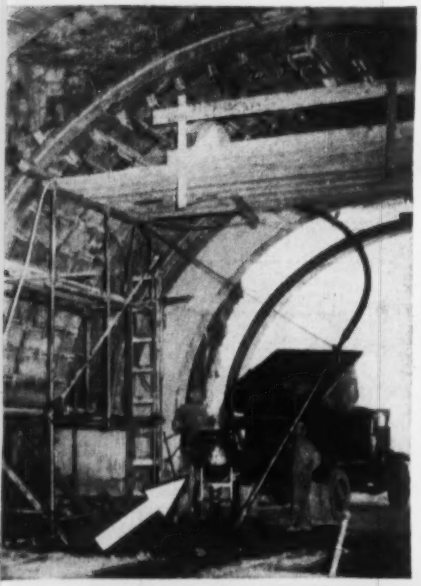

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▲ **Tex., Dallas**—City, City Hall, voted bonds Jan. 31, storm sewers, **$2,900,000**; sanitary sewers, **$7,650,000**. CD 1/6.

▲ **Tex., Houston**—City, City Hall, voted **$3,000,000** bonds sanitary sewers; voted **$3,000,000** bonds storm sewers. CD 1/9

BRIDGES

Calif., Colton—City, City Hall, voted $250,000 bonds, "C" St. grade separation, **$700,000**. Foulke, Crist & Brodie, 2230 Arrowhead Ave., San Bernardino, consult. engrs. CD 11/15.

▲ **Conn., Hartford**—Hartford Bridge Auth., Hartford, 5 bridges over Connecticut River. **$45,000,000.**

▲ **Tex., Dallas**—City, City Hall, voted bonds Jan. 31, bridges, **$1,000,000**. CD 1/6.

▲ **Tex., Houston**—City, City Hall, voted **$1,250,000** bonds, bridges; voted **$1,250,000** bonds, overpass. CD 1/9.

▲ **WEST VIRGINIA**—State Road Comn., Charleston,
Brooke Co.—Steubenville Bridge approaches wid'n intersection W. Va. 2, **$35,000.**
Doddridge Co.—underpass U.S. 50 at West Union grading, draining, paving, **$420,000.**
Grant Co.—Abrams Creek Bridge and approaches, **$267,800.**
Hampshire Co. — Tearcoat Bridge and approaches, **$143,000.**
Kanawha Co.—grading, draining, approaches for four-lane underpass New York Central R.R. and hy. underpass Upper Belle, **$544,300.**
McDowell Co.—Coney Island Bridge and approaches U.S. 52, **$578,500.**
Marshall Co.—Boggs Run Bridge, **$389,000.**
Pocahontas Co.—Greenbank Bridge and approaches, W. Va. 28, **$164,000.**
Putnam Co.—Winfield Bridge flooring and painting, **$250,000**; paving approaches, **$124,200**, toll house for same, **$25,000.**
Randolph Co.—grading, draining approaches to Gilman Bridge U.S. 219, **$200,000.**
Tucker Co.—Clover Run Bridge W. Va. 72, **$100,000.**
Wetzel Co.—bridge across Ohio River, preliminary work on Proctor Bridge, **$425,000.**

STREETS AND ROADS

Ala., Jackson—City, City Hall, paving 10 mi. city streets, curbs, and gutters, **$500,000.**

▲ **Colo., Denver**—Denver City and County, City and County Bldg., Denver, 12-mile super freeway to connect Denver's Valley Hy. and proposed Glen E. Martin aircraft plant in Littleton, **$20,000,000.** Dewey Wright, city engr.

▲ **Tex., Dallas**—City, City Hall, voted bonds Jan. 31, street imprvs., paving, **$12,000,000.** CD 1/6.

▲ **Tex., Houston**—City, City Hall, voted **$3,000,000** bonds extending and opening new streets; voted **$500,000** bonds street blacktopping; voted **$500,000** bonds erection steet name markers. CD 1/9.

▲ **WEST VIRGINIA**—State Road Comn., Charleston,
Brooke Co.—grading, draining 2 mi. highway in vicinity of Wellsburg, **$864,000.**
Cabell Co.—grading, draining, U.S. 60 from Blue Sulphur to Ona, **$356,600.**
Harrison Co.—grading, draining by-pass at Clarksburg, **$89,000.**
Jackson Co.—grading, draining U.S. 33, **$487,000.**
Kanawha Co.—grading, draining 2 mi. Southside Expressway from Patrick St. bridge to South Side Bridge City of Charleston, **$1,300,000.**
grading, draining 2 addnl. lanes, U.S. 60, Cedar Grove, **$100,000.**
McDowell Co.—U.S. 52 Welch by-pass c. conc. paving, **$300,000.**
Mason Co.—paving two-lane W. Va. 2 from Hickory Chapel to Point Pleasant, **$100,000.**
Pleasants Co.—relocating, draining, grading, W. Va. 2 in vicinity of St. Marys, **$856,000.**
Pocahontas Co.—grading, draining from county line to Rimel, **$337,100.**
Preston Co.—grading, draining W. Va. 26, **$100,600.**
Raleigh Co—grading, draining four lane by-pass at Oakwood Ave., Beckley, **$963,000.**
Tucker Co.—grading, draining 2.5 mi. W. Va. 72, **$306,000.**
Upshur and Barbour Counties—grading, draining, relocating, intersection of W. Va. 20 and U.S. 119, **$443,500.**
Wood Co.—grading, draining U.S. 21 from Vienna to Big Run, **$575,000.**
Wyoming Co.—grading, draining W. Va. 79, $355,000.

EARTHWORK, WATERWAYS

N. B., Saint John—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., dredging in Courtenays Bay, **$600,000.**

AIRPORTS

▲ **Tex., Houston**—AIRPORT—City, City Hall, voted $1,500,000 bonds, airport work, **$3,000,000.** CD 1/9.

† **Va., Fort Belvoir**—HELIPORT—U. S. Eng., 1st and Douglas Sts. N. W., Wash., D. C., A/C refuel facilities, Heliport, **$100,000**; A/C hangar with shops-heliport, **$100,000-$500,000**; fire and rescue station-heliport, **$100,000-$500,000.** CD 10/4/51, under Public Buildings.

† **Wash., Spokane**—BULK STORAGE—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, bulk storage jet fuel facility, Fairchild Air Force Base, **$175,000.** Bids in May. CD 1/28/53.

PUBLIC BUILDINGS

▲ **Ark., North Little Rock**—SCHOOLS—North Little Rock School Bd., North Little Rock, bond election Mar. 17, Junior High School, 2 elementary schools, school addns. and field house, **$1,500,000**. CD 5/7/52.

▲ **Calif., Compton**—COLLEGE ADDNS.—Compton Junior College Dist., Compton, **$2,000,000** bond election May 18, Compton Junior College addns.

▲ **Calif., Costa Mesa** — ADMINISTRATION and HOSPITAL UNIT, etc.—State Div. Architecture, 1120 N. St., San Diego, administration and hospital unit, garage and maintenance shop, 3 ward bldgs., site development, Fairview State Hospital, **$7,602,200**. Bids in April. CD 1/14/55.

▲ **Calif., Hawthorne**—SCHOOL—Centinella Valley Union High School Dist., 365 Hawthorne Way, plans by Flewelling & Moody, 766 Colorado Blvd., Los Angeles, Hawthorne High School addn. **$1,000,000**.

Calif., Sacramento—OFFICE ALTERATIONS, etc.—State Div. Architecture, 1120 N. St. Office Building No. 2 alterations, imprvs., Dpt. Finance, **$890,000**. Bids in August.

Calif., San Bernardino—SCHOOL—San Barnardino High School Dist., 799 "F" St., plans by Wm. F. Mellin, 671 "D" St., 19,200 sq. ft. Pacific High School addn. **$500,000**. CD 3/28/50.

Calif., San Jose—SCHOOL—Eastside Union High School Dist. North White Rd., plans by Kress, Goudie & Kress, 363 Park Ave., San Jose, Calaveras Road High School, **$700,000**. O. T. Illerich, Porter Bldg., consult. engr. CD 4/22.

Calif., Santa Cruz—SCHOOL, etc—Santa Cruz City High School Dist., 133 Mission St., plans by Risley & Gould, 2502 W. Third St., Los Angeles, rehabilitation high school, constr. new cafeteria, **$637,000**. CD 6/16.

▲ **Colo., Lakewood**—SCHOOLS—Jefferson County School District R-1, Lakewood, plans by Ralph Peterson, archt.-engr., 1701 Gilpin St., Denver, high school, 35 and Independence St., Wheat Ridge, **$2,000,000**; high school, 8 and Independence Sts., Lakewood, **$2,000,000**. CD 11/14.

▲ **Conn., New Haven**—COURT HOUSE—Comrs. New Haven Co., 121 Elm St., plans by Carl R. Blanchard Jr., 111 Whitney Ave., county court house addn., **$550,000** or new court house, **$4,000,000**.

▲ **Conn., Waterbury**—HIGH SCHOOL—City, Bd. Educ., Town Hall, high school, **$1,000,000**. CD 1/6/50.

▲ **Idaho, Boise**—SCHOOL—Boise School Dist., Boise, defeated **$1,900,000** bonds. Jan. 24, high school. CD 1/5.

▲ **Ill., Carbondale**—DORMITORIES—Dpt. Educational, Springfield, plans by Perkins & Will, 309 W. Jackson Blvd., Chicago, Zone 6, 6 new dormitories, Southern Illinois University. **$4,000,000**. CD 1/26.

Ill., Elmhurst—SCHOOL—School District 88, 355 W. St. Charles Rd., plans by Childs & Smith, 20 N. Wacker Dr., Chicago, Zone 6, York High School. **$500,000**. CD 12/17/51.

Ill., Waukegan—SCHOOL—School District 61, 574 McAllister Ave., plans by Gangster & Henninghausen, 222 Washington St., grade school, Blanchard and Lewis Sts. **$630,000**. CD 1/6.

▲ **Ind., East Chicago**—SCHOOLS—School City of East Chicago, Garfield Elementary School and Junior High School. **$1,000,000**.

† **Iowa, Ames**—POST OFFICE, etc.—General Services Admin., Public Bldgs. Service, 2306 E. Bannister Rd., Kansas City, Mo., brick, concrete, steel post office and federal office bldg. **$600,000**.

▲ **La., Lake Charles**—DORMITORIES—State Bldg. Auth., State Capitol, Baton Rouge, 2 men's dormitory; 1 women's dormitry; 5 apartments for married students at McNeese State College, **$1,500,000**.

Mass., Ipswich—SCHOOL—Town, High School Bldg. Comn., Russell Dreikorn, chn. School Dpt., plans by Leland, Larsen, Bradley & Hibbard, 711 Boylston St., Boston, high school, **$600,000**. CD 7/15/54.

Mass., Springfield—HOUSING—City, Springfield Housing Auth., 124 Putnam Circle, plans by Louis C. Hinckley, 1618 Main St., housing for elderly, **$525,000**. Bids soon. CD 1/30/52.

Mich., Clinton—SCHOOL—Bd. Educ., Clint Community School Dist. No. 4, Lenawee and Washtenaw Counties, Clinton, voted **$550,000** bonds Jan. 23, school expansion, grade school, high school addn. Nat Gould, Plymouth, archt.

▲ **Mich., Detroit**—COMMUNITY CONFERENCE CENTER—City, Bd. Educ., 1354 Broadway, plans by Yamasaki, Leinweber & Assocs., 112 Madison St., Detroit, Zone 26, 2 story community conference center, Wayne University, Second and Ferry Sts. **$1,000,000**.

▲ **Mich., Grosse Pointe**—SCHOOLS—Grosse Pointe Consolidatel School Dist., James W. Lee, pres., voted **$3,500,000** bonds Jan. 24, Junior High School, two swimming pool addns. to Junior High Schools, Grosse Pointe Farms. CD 11/16.

Mich., Litchfield—SCHOOL—Bd. Educ., Litchfield Community Schools, Litchfield, plans by Louis C. Kingscott & Assoc., 511 Mounroe St., Kalamazoo, high school, Garfield St. **$500,000**.

▲ **Mich., Plymouth** — SCHOOL — City, Bd. Educ., Plymouth, plans by Eberle M. Smith Assoc., Inc., 153 E. Elizabeth St., Detroit, Zone 1, Junior High School. **$1,200,000**. CD 4/4.

▲ **Minn., Albert Lea**—SCHOOL—Bd. Educ., Mrs. Leslie Hellie, clk., $4,360,024 bond election Feb. 13, Junior High School, Central High School Gymnasium, 3 elementary schools, **$2,250,000**, B. J. Hein, Albert

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Lea, and Hammell & Green, 1932½ University Ave., St. Paul, archts. Grade schools planned for this year, high school for 1957. CD 10/8/54.

▲ **Minn., Anoka**—HIGH SCHOOL—Bd. Educ., R. K. Nelson, clk., School Dist. No. 220, Anoka, plans by Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, Junior High School. **$1,000,000**. CD 10/22/52.

Minn., Minneapolis—SCHOOL—Bd. Educ., 807 N. E. Broadway, plans by Magney, Tusler & Setter, 313 Roanoke Bldg., Shingle Creek Grade School along Shingle Creek between 50 and 51 Aves. North, **$700,000**. To go ahead in 1957 or later.

Minn., St. Paul—HEALTH CENTER—City, Bureau P. Health, 101 E. 10 St., plans by A. H. Schroeder, city archt., City Hall and Court House, L-shaped health center, College Ave. between Wabash and Cedar Sts. and between College and 10 Sts., on State Capitol approach, **$600,000**. CD 10/21/54.

Mo., Cape Girardeau—DORMITORY—Southeast Missouri State College, Bd. Regents, Cape Girardeau, women's dormitory, **$587,000**; men's dormitory, **$500,696**.

▲ **Mo., Columbia**—DORMITORIES—Curators of the University of Missouri, Dr. Elmer Ellis, pres., Jesse Hall, Columbia, plans by Hellmuth, Obata & Kassabaum, 825 Locust St., St. Louis, Zone 1, dormitories to house students, **$12,000,000-$15,000,000**. CD 1/26.

▲ **Mo., Columbia**—LIBRARY, etc.—Curators of the University of Missouri, Dr. Elmer Ellis, pres., Jesse Hall, library addn., **$4,000,000**; agricultural bldg. addn., **$2,100,000**; constr. and completion of Fine Arts Bldg., **$1,800,000**; addn. to Engineering bldg. to provide addnl. classrooms and completion of laboratories, **$1,000,000**; new bldg. to house School of Veterinary Medicine, **$1,000,000**; Home Economics bldg. addn., **$800,000**; classroom bldgs., **$3,000,000**; addn. to School of Journalism Bldg., **$750,000**; gymnasium addn. to provide swimming pool for men, **$450,000**; arena, field house for livestock judging, shows and sales, **$2,500,000**; Business and Public Administration Bldg. to provide 60,000 sq. ft. space for classrooms, statistical laboratory, reading room, offices, **$1,500,000**; greenhouses, **$250,000**. CD 3/1/46.

Mo., Farmington—COTTAGES—Missouri State Hospital No. 4, Dr. Emmett F. Hector, supt., Farmington, remodeling, fireproofing 5 cottages for patients, **$500,000**.

▲ **Mo., Fulton**—ADMINISTRATIVE, etc.—Missouri State Hospital No. 1, E. J. McKee, bus. mgr., Fulton, central administrative and clinical bldg. to incl. quarters for physicians apartments, **$1,525,000**, bldg. to house the criminally insane, **$520,000**; bldg. for senile patients, **$350,000**.

▲ **Mo., Kirksville**—AUDITORIUM, etc.—Northeast Missouri State College, Walter H. Ryle, pres., Kirksville, auditorium, **$975,000**; men's dormitory, **$445,000**; physical educational bldg. incl. separate gymnasiums for men and women, **$1,485,000**. CD 5/27/47.

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▲ **Mo., Ladue**—SCHOOL—Ladue School Dist. voted **$3,000,000** bonds Jan. 31, elementary school, Junior High School, purchase of sites for addnl. new bldgs. CD 1/17.

▲ **Mo., Nevada**—DORMITORY, etc.—Missouri State Hospital No. 3, Stephen D. Gibson, bus. mgr., Nevada, dormitory to house working patients, **$500,000**; L-shaped hospital for senile patients, **$1,500,000**.

▲ **Mo., Rolla**—LABORATORIES, etc.—Missouri School of Mines & Metallurgy, Rolla and c/o Curators of University of Missouri, Jesse Hall, Columbia, completion of laboratories, **$1,000,000**; classroom bldg., **$750,000**; students' infirmary, **$350,000**; new bldg. to house Civil Engineering & Mechanics Departments, **$1,500,000**.

▲ **Mo., St. Joseph**—HOSPITAL BLDGS.—Missouri State Hospital No. 2, 34 and Frederick Sts., bldg. for senile patients, **$3,000,000**; acute surgical hospital, **$3,000,000**; 3 story hospital addn., **$500,000**.

Mo., St. Louis—SCHOOL— Missouri School for the Blind, Robert H. Thompson, supt., 3815 Mangnolia Ave., Zone 10, 2 story school addn. **$960,000**.

▲ **Mo., St. Louis**—ADMINISTRATION, etc.—St. Louis State Hospital, Dr. Louis H. Kehler, supt., 5400 Arsenal St., Zone 9, administration and clinic, **$6,000,000**; infirmary for senile patients, **$2,000,000**; repairing, remodeling, existing bldgs., incl. correction of fire hazards, **$1,721,300**; bldg. to provide living quarters for resident physicians, **$450,000**; 50-bed psychiatric section for children, **$750,000**; nurses home, **$1,000,000**; imprv. occupational and recreational therapy facilities, **$500,000**. CD 3/2/53.

▲ **Mo., St. Louis Co.**—SCHOOLS—School District R-8, Bd. Educ., David A. Punch, supt. Schools, 4900 S. Lindberg Blvd., Crestwood, Zone 23, voted **$1,300,000** bonds Jan. 21, schools and school addns. **$1,500,000**.

Neb., Lincoln—LIBRARY—City, City Hall, plans by Hazen & Robinson, 305 Stuart Bldg., main library. **$850,000**. CD 1/20.

▲ **N. Y., Buffalo**—MUSIC AND VISUAL ARTS CENTER—University of Buffalo, 3435 Main St., plans by Paul Schweikher, c/o Yale University, Architecture Dpt., New Haven, Conn., 2 unit brick, glass, steel Music and Visual Arts Center connected by glass panelled walls. **$1,000,000**.

▲ **N. Y., Carthage**—SCHOOL—Carthage Central School Dist. No. 1 plans by Sargent, Webster, Crenshaw & Folley, 2112 Erie Blvd. E., Syracuse, Junior and Senior High School, **$2,000,000**. Bids in March.

▲ **N. Y., Hammondsport**—SCHOOL—Central School Dist. No. 1 plans by Sargent, Webster, Crenshaw & Folley, 2112 Erie Blvd. E., Syracuse, Central School, **$1,000,000**. Bids in April.

O., Berea—HOSPITAL—Berea Community Hospital, Front St. and Bagley Rd., plans by Mellenbrook, Foley & Scott, 20 Beech St., hospital addns. **$850,000**. Bids in Summer.

▲ **O., Painesville**—HOSPITAL—Lake County Memorial Hospital, Painesville, plans by Conrad & Simpson, Hanna Bldg., Cleveland, Zone 15, hospital wing. **$2,025,000**. CD 11/11.

O., Vandalia—HIGH SCHOOL—Bd. Educ., Butler Twp. School Dist., Vandalia, **$965,000** bond election May 8, high school, Alkaline Springs Rd. CD 11/9/54.

▲ **Ore., Portland**—HOSPITAL—Bd. Control, Capitol, Salem, plans by Glenn Stanton, Concord Bldg., general mental hospital. **$14,000,000**. CD 3/29/51.

▲ **Tex., Houston**—CIVIC CENTER—City, City Hall, voted **$1,500,000** bonds civic center. CD 1/9.

▲ **Tex., Lubbock**—SCHOOL—Lubbock Independent School Dist., Lubbock, plans by Butler-Kimmel Co., 412 Ave. M, Lubbock, Junior High School No. 1. **$1,000,000**. CD 10/27.

▲ **Utah, Salt Lake City**—OFFICE—State Building Bd., 419 State Capitol Bldg., office for State of Utah. **$12,000,000**. Constr. possibly in 1957. CD 4/8/46.

▲ **Utah, Salt Lake City**—BUILDINGS—University of Utah, Bd. Regents, R. C. Culp, Chn., State Capitol, Carlson Hall addn., **$1,000,000**; family living center, **$5,250,000**. CD 10/6/54.

▲† **Wash., Fort Lewis**—POST EXCHANGES, etc.—U. S. Eng., 4735 E. Marginal Way, Seattle, Wash., 2 post exchanges, **$175,000**; 2 dispensaries, **$125,000**. Bids in Spring; 23 ammo storage igloos, **$700,000**. Bids in March. CD 11/7/51.

▲ **Ont., Ottawa**—LABORATORY, etc.—Dpt. P. Wks., Hunter Bldg., plans by E. A. Gardner, c/o owner, chemical laboratory, **$1,000,000**; administration bldg., **$400,000**; geological surveys bldg. **$750,000**, all for Dpt. Mines & Technical Surveys. CD 2/9/53.

▲ **Que., Quebec City**—NORMAL SCHOOL—Provincial Dpt. P. Instruction, Parliament Bldgs., plans by Maurice Mainguy, 565 St. Jean St., Quebec City, Que., and J. Aurele Bigonesse, 3 Parloir St., normal school. **$2,000,000**. CD 9/30/53.

COMMERCIAL BUILDINGS

▲ **Conn., South Windsor**—HOUSING—South Windsor Heights Inc., Graham Rd., 300-unit housing. **$4,200,000**.

▲ **Fla., Fort Myers**—HOUSING UNITS—Procurement Officer, Buckingham Air Force Base, Ft. Myers, construct and finance 470 housing units, Buckingham Air Force Base. Bids About Oct. 1.

▲ **Ga., Atlanta**—SHOPPING CENTER—Samuel Roberts Noble Foundation, Ardmore, Okla., plans by Toombs, Amisano & Wells, 70 Fairlie St. N.W., regional shopping center, Lenox and E. Paces Ferry Rds. Over **$15,000,000**.

(Continued on page 264)

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WHEELBARROWS	3 to 5 cu. ft.	200 ft.	walking	1 to 1½ cu. yds.

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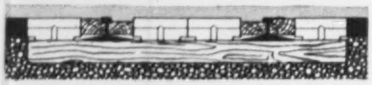

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(Continued from page 262)

▲ **Ill., Riverside**—OFFICE—Acme Steel Co., 134 St., and Penn R.R., plans by Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Zone 4, office bldg. **$1,500,000.**

▲ **Ind., Fort Wayne**—HOMES—Northcrest Corp., Ralph Shirmeyer, pres., 120½ E. Washington St., 109 homes, Section 1, Northcrest addn. **$1,000,000.**

▲ **Mich., Detroit**—RESIDENTIAL REDEVELOPMENT—Herbert S. Greenwald, 135 S. La Salle St., Chicago, Ill., and Samuel N. Katzin, 6522 S. Cottage Grove St., Chicago, Ill., plans by Ludwig Mies van der Rohe, 230 E. Ohio St., Chicago, Ill., Gratiot Redevelopment Project, incl. residential construction, apartment bldgs., terrace-type housing, on 119 acres. **$25,000,000.**

▲ **Minn., St. Paul**—HOSPITAL—St. Joseph's Hospital, 69 Exchange St., plans by Ellerbe & Co., E. 505 First National Bank Bldg., 5 story hospital addn., remove east and west wings, remodel north wing and main structure, etc. **$5,000,000.**

▲ **Mo., Clayton (St. Louis 5 P.O.)**—OFFICE—Randolph Development Corp., Joseph A. Campagna, pres., 18 S. Kingshighway, St. Louis, Zone 10, plans by Raymond E. Maritz, 721 Olive St., St. Louis, Zone 1, 4 story, bsmnt., 70,000 sq. ft. office space, Claybent Medical Center bldg. at Clayton Rd. and Brentwood Blvd. with adjacent parking facilities. **$1,750,000,** Wells & Wells, Inc., Security Bldg., 319 N. 4 St., St. Louis, Zone 2, consult. engr.

▲ **N. J., Springfield and Milburn**—DEPARTMENT STORE—Saks Fifth Ave., Fifth Ave. and 49 St., New York, N. Y., plans by Kahn & Jacobs, 2 Park Ave., New York 6, N. Y., department store on 9-acre tract on Millburn Ave. near Morris Ave. **$1,300,000.**

▲ **N. Y., Buffalo**—SHOPPING PLAZA—Basex Realty Co., c/o L. A. Grant Co., Rand Bldg., plans by Backus, Crane & Love, 232 Delaware Ave., shopping plaza, incl. 40 units, Base Line Rd. and Express Hy. on Grand Island, **$2,000,000.**

▲ **N. Y., Buffalo**—LIBRARY—University of Buffalo, 3435 Main St., plans by Paul Schweikher, chm. Dpt. Architecture, Yale University, New Haven, Conn., library for music and visual arts library. **$1,000,000.** To be done in 1957.

▲ **N. Y., Hamburg**—SHOPPING CENTER—Roxie Gian, 210 Cornwall St., Buffalo, plans by Stanley C. Podd, 361 Delaware Ave., Buffalo, 40 unit shopping center, on 90 acre site, **$2,500,000.** Constr. in Spring.

▲ **N. Y., Hamburg**—SHOPPING PLAZA—Wanakah Plaza, Inc., Roxie Giam, pres., c/o Stanley C. Podd, archt., 361 Delaware Ave., Buffalo, 40-store shopping plaza, Rte. 20 and Rogers Rd., 300-car parking. **$2,500,000-$3,000,000.** To start in spring.

▲ **N. Y., New York**—OFFICE, etc.—National Council of Churches of Christ in U.S.A., 297 4th Ave., plans by Collens, Willis & Beckonert, 20 Newbury St., Boston, Mass., and Voorhees, Walker, Smith & Smith, 101 Park Ave., New York, Zone 17, 17 story limefaced office with sub-bsmnt. garage, Riverside Dr., 119 and 120 Sts. **$15,000,000.** CD 5/19.

▲ **N. Y., Niagara Falls**—HOTEL—Treadway Inns, 284 East Ave., Rochester, plans by Russell Larke, 751 Seventh Ave., motor hotel, 4 acre site, on the upper rapids of Niagara Falls, **$2,000,000.**

N. Y., Troy—DORMITORY—Russell Sage Co., 45 Ferry St., plans by Niels H. Larsen, 711 Boylston St., Boston, Mass., dormitory. **$800,000.** Bids in March. CD 1/30.

▲ **Okla., Tulsa**—SHOPPING CENTER—Ben Crowley, 512 S. Cheyenne St., plans by Leon Senter, Philtower Bldg., shopping center, 51st and Peoria Sts. **$1,500,000.**

Pa., Greenville—SCIENCE, etc.—Thiel College, Greenville, plans by Arthur L. Martsolf & Assocs., 512 Third Ave., New Brighton, science bldg. and dormitory. **$750,000.** CD 10/26.

▲ **Tex., Fort Worth**—SHOPPING CENTER—Wedgewood Land Co., Granberry Rd., plans by Knees & Ham, 2504 W. Berry St., 6 building unit shopping center. **$1,350,000.**

▲ **Tex., Houston**—SCIENCE, etc.—Texas Southern University, 3201 Wheeler St., plans by Wyatt & Hedrick, 5201 Fannin St., 3 story, 86,000 sq. ft., rein.-con. brick science, **$1,410,000;** rein.-conc. brick library, **$565,000.**

Tex., Houston—SHOPPING CENTER—Truett Peachey, Developer, 1220 Polk St., plans by Golemon & Rolfe, 5100 Travis St., shopping center, Witte Rd., near Spring Branch. **$750,000.**

▲ **Utah, Provo**—INFIRMARY—Eldred Sunset Manor Foundation, Inc., c/o Fred L. Markham, archt., 45 North University St., infirmary. **$1,000,000.** Bids late 1956.

▲ **Utah, Salt Lake City**—OFFICE—Mountain Fuel Supply Co., 36 South State St., plans by Hodgson & Holbrook, 427 Kiesel Bldg., Ogden, office, First South and Second East. **$1,500,000. CD 6/16.**

▲ **Wis., Appleton**—DORMITORY, etc.—Lawrence College, Appleton, plans by Frank C. Shattuck Assocs., Inc., 174 E. N. Water St., Neenah, men's dormitory, **$500,000;** music-drama center, **$1,000,000.**

▲ **Man., St. Boniface**—SHOPPING CENTER—Ladco Co. Ltd., 2281 Portage Ave., Winnipeg, plans by Green, Blankstein, Russell & Assocs., 222 Osborne St., Winnipeg, shopping center, 24-acre lot **$1,000,000.** W. L. Wardrob & Assocs., Parks Bldg., Winnipeg, consult. engrs.

▲ **Ont., Toronto**—APARTMENT—Daymond Corp., 211 Lonsmount Dr., plans by E. I. Richmond, 455 Spadina Ave., 154-suite, 13 story, masonry, steel, rein.-con. apartment, 109-119 Lawton Blvd. **$1,232,000.**

▲ **Ont., Windsor**—SHOPPING CENTER—Owner, c/o Morris Constr. Co. Ltd., Morris Tabachanick, vice pres., Windsor, shopping center, incl. 15 stores and parking facilities, **$1,000,000.**

INDUSTRIAL BUILDINGS

▲ **Calif., Antioch**—PLANT—Fibreboard Products, Inc., Antioch, 1 story, mezzanine, 260,000 sq. ft. plant. **$3,000,000.**

▲ **Calif., Moss Landing**—ROTARY KILN—Kaiser Chemicals Div., Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Zone 12, rotary kiln at seawater magnesia plant. **$1,500,000.**

▲ **Calif., Palo Alto**—LABORATORY—Lockheed Aircraft Corp., 1705 Victory Pl., Burbank, two 51,000 sq. ft. laboratory bldgs., Stanford University Campus, for advanced study of missiles and unmanned aircraft. **$6,000,000.**

▲ **Calif., Sunnyvale**—PLANT—Lockheed Aircraft Corp., 1705 Victory Pl., Burbank, 96,000 sq. ft. aircraft plant for Missile Systems Div. **$1,000,000.**

Conn., Westport—STORAGE TANK—Bridgeport Hydraulic Co., 835 Main St., Bridgeport, 1½ m.g. storage tank, North Ave. **$104,000.** Turbine Equipment Co., 63 Vesey St., New York, N. Y., consult. engr.

▲ **Ill., Chicago**—COKE OVENS—Interlake Iron Co., 1910 Union Commerce Bldg., Cleveland 14, O., 50 coke ovens (second unit) and high level bridge over Calumet River to carry pipe line and conveyor belt to blast furnace. **$15,900,000.**

▲ **Ill., Chicago**—HEATING PLANT—Northwestern University, 619 Clark St., Evanston, plans by Holabird, Root & Burgee, 180 N. Wabash St., Chicago, Zone 1, heating plant, 330 E. Ontario St., on Chicago Campus. **$2,100,000.**

▲ **Ind., Alexandria**—PLANT—National Gypsum Co., 325 Delaware Ave., Buffalo, N. Y., rock wool acoustical tile plant addn. **$1,000,000.**

▲ **Ind., Gary**—STORAGE WAREHOUSE—Shamrock Eng. Co., 865 S. Lake St., plans by D. Katz, 355 Arthur St., 8 storage warehouses. **$3,000,000.**

▲ **Iowa, Council Bluffs**—POWER, etc.—Iowa Power & Light Co., 823 Walnut St., Des Moines, power bldg. and generating equip. **$13,000,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo. consult. engrs. CD 1/24

Kan., Belleville—SHOP, etc.—North Central Kansas Electric Co-operative, Belleville, shop, warehouse with offices. **$100,000.**

Kan., Hutchinson—PUBLISHING—Hutchinson Publishing Co., Hutchinson, plans by McCrackin & Hiett, Hutchinson, newspaper publishing bldg. **$400,000.** CD 8/3.

La., Shreveport—SERVICE CENTER—Southwestern Gas & Electric Co., 428 Travis St., plans by Walker & Walker, Slattery Bldg., service center, consisting 3 separate bldgs., operating headquarters, warehouse meter department and garage. **$725,000.**

▲ **Md., Sparrow Point**—PLANT—Bethlehem Steel Corp., Bethlehem, Pa., steel plant addn. to produce 2,000,000 tons ingot. **$200,000,000.**

Mass., Waltham—MANUFACTURING—W. H. Nichols Co., 48 Woerd Ave., plans by Bastille, Halsey Assoc., 120 Tremont St., Boston, 15,000 sq. ft. mfg. bldg. addn., Woerd Ave. **$120,000.**

▲ **Mo., St. Louis**—SERVICE—Stix, Baer & Fuller Co., Lee C. Fuller, Bd. Chn., 601 Washington Ave., Zone 1, service bldg., 13-acre site, Kingsland Ave. and St. Louis Terminal R. R. tracks. **$2,000,000.**

Neb., Lincoln—SHOP, etc.—Henry Misle, 543 N. 48 St., plans by G. W. Bouton, Hastings, shop, warehouse, office **$200,000.** CD 10/11.

Neb., McCook—MANUACTURING—The McCook Corp., McCook, mfg. bldg. **$200,000.**

▲ **N. Y., Lackawanna**—PLANT—Bethlehem Steel Corp., Bethlehem, Pa., steel plant addn. to produce 600,000 addnl. tons. **$60,000,000.** CD 5/3/45.

N. Y., New York—BAKERY, etc.—Horn & Hardart Co., 600-636 W. 50 St., Zone 19, plans by Cowell & Robinson, 25 W. 43 St., Zone 36, altering bakery and commissary bldg. at site, **$250,000.**

▲ **O., Maple Heights**—WAREHOUSE—Pick-N-Pay, 3621 Chester Ave., Cleveland, Zone 14, 200,000 sq. ft. brick, steel, concrete block warehouse, Rockside Rd. **$1,000,000.** L. K. Norman, c/o owner, engr. Bids about March 15.

O., Toledo—FACTORY—Surface Combustion Corp., 2375 Dorr St., 25,000 sq. ft. factory addn. **$250,000.**

O., Toledo—PLANT—Surface Combustion Corp., 2375 Dorr St., 25,000 sq. ft. plant addn. for assembly of industrial heat furnaces. **$250,000.** Construction for March 1.

O., Cleveland—BOTTLING PLANT—Pepsi-Cola Bottling Co. of Cleveland, 3209 Chester Ave., Zone 14, plans by Anton G. Nosek, Jr., Hanna Bldg., Cleveland, Zone 15, 1 story, 34-40,000 sq. ft., brick, bottling plant. **$700,000.**

▲ **O., Columbiana**—HANDLING FACILITIES—Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif., pressing and materials handling facilities. **$1,500,000.**

O., Kenton—FACTORY—Hooker Electrochemical Co., 1940 Ward St., Niagara Falls, N. Y., factory addn. to Durez Plastics Division plant. **$250,000.**

O., Monroeville—SILOS—Monroeville Co-operative Grain Co., Monroeville, 4 slip-form silos to provide addnl. 90,000 bu. storage at plant, Baker St. **$125,000.**

Okla., Tulsa—PLANT, etc.—Well Surveys, Inc., Daniels Bldg., plant and warehouse, 15 and Utica Sts. **$300,000.** John H. Buck, c/o owner, engr.

(Continued on page 266)

How tractor-on-rubber speeds highway improvement work *in Ethiopia*

Excess earth is dozed into valleys where it will later be used to fill around trees and culverts. Big 4-wheel air-brakes give operator confidence to work safely near steep banks.

Earthmovers around the world have found the versatile 19 mph Tournatractor a handy tool on a wide range of dirtmoving assignments. Typical jobs and problems encountered by contractors in Chile, Iraq, or Malaya are usually quite similar to dirtmoving "headaches" in Maine, Texas, or California. For example, here's how 5 Tournatractors, working under adverse conditions, speed work assignments for the Imperial Government of Ethiopia.

To improve their national highway system the Ethiopian Government works 5 high-speed Tournatractors on a busy 12 month-a-year schedule. These rubber-tired tractors operate in rainy highlands, arid deserts, in near-freezing temperatures, and often in equatorial heat. Material ranges from wet mud to abrasive sand and rock . . . yet Tournatractors have proved efficient under all conditions.

Prevents landslides near Addis Ababa

The advantages of these versatile units are clearly illustrated by a recently-completed landscaping project near Addis Ababa. The job consisted of benching hills to keep landslides from blocking a modern all-weather asphalted highway which circles the mountains around the city.

Tournatractor strips heavy sod and levels subsoil to prepare athletic field for a police training school. Rolling action of big low-pressure tires help compact material.

Tournatractor worked at more than 8400 feet above sea level to doze a mixture of loam, decayed top vegetation, and dry, hard red clay. It dug out many deeply rooted stumps which dotted the area. It crossed pavement and traveled along the highway without damaging the bituminous surface. Its mobility, plus high rate of production, enabled the unit to complete the project well ahead of schedule. Government officials say this *one* rubber-tired Tournatractor did the work in *one-third* less time than could a combination of *two* crawler-tractors.

Levels 2500 cu. yds. in 40 hours

Another of the Government's Tournatractors performed equally well when it stripped and leveled a new athletic field for the Ethiopian Police Training School near Addis Ababa. In five 8-hour days, this machine moved 2500 cubic yards of earth and sod. Total included all rough and final dozing; even some finish-grading.

Meanwhile, the third Tournatractor stockpiled materials for highway surfacing. At the same time, the fourth and fifth Tournatractors, equipped with power control units, pulled 11-yard LeTourneau-Westinghouse Scrapers to build shoulders and drainage ditches along highways.

From time to time as needed, the 19 mph Tournatractors took time off from other assignments to pull LeTourneau-Westinghouse Rooters that ripped old bituminous road surfacing before retopping.

Tractor-on-rubber speeds can help cut costs and save time on your earthmoving, too. Ask your LeTourneau-Westinghouse Distributor to help you estimate savings possible on your operation.

Rooter, Tournatractor—Trademark Reg. U.S. Pat. Off. T-978-G-b

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

On highway construction, road maint

(Continued from page 264)

▲ **Pa., Bethlehem**—PLANT—Bethlehem Steel Corp., Bethlehem, steel plant addn. to produce 400,000 addnl. tons. **$40,000,000.**

▲ **Tex., Austin**—PLANT—The Steck Co., 205 W. 9th St., plans by Kuehne, Brooks & Barr, Perry-Brooks Bldg., printing plant expansion to include new plant north of here. **$1,000,000.**

Tex., Dallas—TERMINAL—Sunset Motor Lines. 1514 Cockrel St., plans by Donald R. Goss, 707 McBurnett St., San Angelo, motor freight terminal, incl. docks. **$175,000.** CD 7/23/54.

Tex., Houston—WAREHOUSE—Pfeffer & Son, 10030 Hempstead Way, 1 story, 75,000 sq. ft. rice warehouse. **$375,000.**

▲ **Tex., Lone Star**—INDUSTRIAL BLDGS.—Lone Star Steel Co., Lone Star, constr. "Stretch Mill" **$4,000,000;** new electric furnace unit or addnl. open hearth furnace, **$1,750,000;** capital expenditures for the year in iron and steel divisions, **$1,000,000.** pipe mills imprvs., modifications, **$400,000;** constr. Tailings Dam near ore beneficiation plant, **$350,000;** constr. protective measures for coal mines (in Okla.), **$125,000;** misc. imprvs. to existing steel plant units, **$300,000.** CD 7/6/51.

Tex., Waxahachie — DIAL-EQUIPMENT — Southwestern Bell Telephone Co., Waxahachie, dial and equip. bldg. **$200,000.**

▲ **Utah**—STEAM PLANT—Utah Power & Light Co., Kearns Bldg., Salt Lake City, Zone 10, steam plant, Bear Lake. **$15,000,000.** Possibly started in 1956.

▲ **Wis., Milwaukee**—WAREHOUSE, etc.—Central Steel Wire Co., 6623. W. Mitchell St., plans by Friedman, Alschuler & Sincere, 223 W. Jackson Blvd., Chicago, Ill., 1 story, 100x650 ft. warehouse and Office. **$1,000,000.**

▲ **Philippines**—OIL REFINERY—Standard-Vacuum Oil Co., 26 Broadway, New York, N. Y., oil refinery, **$35,000,000.**

▲ **Alta., Calgary**—PLANT—Anthes Imperial Co. Ltd., St. Catherines, Ont., 1 story, 50,000 sq. ft. c.i. pressure water pipe mfg. plant. **$2,000,000.**

▲ **N. S., Sydney**—PLANT—Dominion Steel & Coal Corp., Ltd., Canada Cement Bldg., Montreal, Que., coal washing plant. **$1,000,000.**

Ont., Alliston—PLANT—Baxter Laboratories, 6301 Lincoln St., Morton Grove, Ill., U. S. A., plant, Centre St. **$300,000.**

▲ **Ont., Sarnia**—REFINERY UNITS—Polymer Corp. South Vidal St., new butadiene unit **$3,000,000;** general imprvs. and altering chemical plant, **$1,910,000;** third stage of expansion program in butadiene rubber section of plant, **$600,000.** Giffels & Vallet of Canada Ltd., 65 Elliott St. E., Windsor, consult. engrs. CD 9/21/50.

Ont., Toronto—WAREHOUSE, etc.—Alloy Metal Sales Ltd., 181 Fleet St., warehouse and office expansion **$950,000.** Giffels & Vallet of Canada Ltd., 12 Richmond St. E., consult. engrs.

Ont., Toronto—FACTORY—Finley W. McLachlan Ltd., 195 Fairbank Ave., 1 story masonry factory, Alton Ave. **$600,000.**

▲ **Que., Montreal**—PLANT—Procter & Gamble Co. of Canada Ltd., Burlington St. E., Hamilton, Ont., plant Over **$1,000,000.** J. A. McCuaig, c/o owner, ch. engr.

Que., Notre Dame de la Solette—MILL—Eastern Asbestos Co. Ltd., 132 St. James St. W., Montreal, 1 story asbestos mill. **$300,000.** W. A. Rukeyser, 132 St. James St. W., Montreal, consult. engr.

Que., St. Felicin—GARAGE—Oswald Veneault, Village Bellevue, garage. **$100,000.**

UNCLASSIFIED

California—HONOR CAMP—State Div. Architecture, 1129 N. St., Sacramento, honor camp, Vallecito, Div. of Forestry, Calaveras Co. **$335,000.**

Calif., San Francisco — CORPORATION YARD — State Div. Architecture, 1120 N St. Sacramento, corporation yard, San Francisco State College, Dpt. Education, **$240,000.** Bids in April.

† **Colo., Fort Logan**—CEMETERY—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., cemetery development. **$100,000-$300,000.**

Ind., Fort Wayne—SWIMMING POOL—City Bd. Park Comrs., City Hall, swimming pool in Foster Park. **$150,000.**

Iowa, Waverly—STADIUM—Wartburg College, Waverly, stadium. **$100,000.**

▲† **Maryland**—HEADQUARTERS—U. S. Eng., First and Douglas Sts. N.W., Wash., D.C., battalion headquarters, Special AAA, Suitland, **$500,000-$1,000,000;** battalion headquarters, W-92 Special AAA, Rockville, **$500,000-$1,000,000.** CD 9/13.

▲ **Mass., Westboro**—RACE TRACK—Allied Sports, Inc., Bernard J. Molaghan, pres., Whiting St., Lunenberg, race track ½ mi. track, grandstand, club house, barns, etc. **$1,000,000.** Bayer & Mingolla Constr. Co., Inc., 550 Park Ave., Worcester, consult. engr. CD 11/16/54.

Missouri—TELEPHONE FACILITIES—Chariton Valley Telephone Corp., Earl L. Bennett, mgr., Bucklin, rural telephone facilities, incl. lines and converting towns of Jacksonville and Prairie Hill to dial operations. **$227,000.** Sloan, Cook & Lowe, 120 S. La Salle St., Chicago, Ill., consult. engrs. CD 9/30.

Mo., Marshall—SPRINKLER SYSTEM—Missouri State School for Epileptics and Feeble Minded persons, Marshall, installation of sprinkler systems, in existing bldgs., **$100,000;** addnl. water mains with fire hydrants to increase fire protection, **$200,000.**

▲ **N. Y., Syracuse**—PARK—Onondaga County Park & Planning Bd., Onondaga Lake Park, Liverpool, plans by Sargent, Webster, Crenshaw, & Folley, 2112 Erie Blvd., E. Syracuse, Zone 3, constr. West Shore Park along Onondaga Lake, 180 acres, clearing of ground, **$293,000;** earth work fill, **$1,306,210;** major structures, **$850,000;** sewage disposal system, **$114,000;** water system, **$73,910;** storm drainage, **$36,300;** road and parking, paving, **$213,755;** boat rental and harbor, **$74,565;** seeding and planting, **$208,600;** electric Service, **$88,000;** misc. work, **$338,702.** Constr. to begin in 1956.

O., University Heights—PARKING LOT PAVING—City, City Hall, 2300 Warrensville Center Rd., Cleveland, Zone 18, paving municipal parking lot, south of May Co. store at Warrensville Center and Lansdale Rd. **$100,000.** H. C. Peterson, c/o owner, engr.

Texas—RURAL DISTRIBUTION LINES—Concho Valley Electric Co-operative, San Angelo, 120 mi. rural distr. lines, sys. imprvs., Tom Green Co. **$425,000.**

Texas—RURAL DISTRIBUTION LINES—Grayson-Collin Electric Co-operative, Van Alstyne, rural distr. lines, sys. imprvs., Grayson, Collin and Fannin Counties. **$205,000.**

Texas—RURAL DISTRIBUTION LINES—Johnson County Electric Co-operative, Cleburne, rural distr. lines, Johnson, Somervell, Tarrant, Hood, Ellis and Bosque Counties. **$157,000.**

▲ **Tex., Houston**—PARKS, etc.—City, City Hall, voted bonds parks and recreation, **$2,500,000.** CD 1/9.

▲ **Tex., Houston**—TRAFFIC CONTROL SYSTEM—City, City Hall, voted **$2,000,000.** bonds, electric traffic control system. CD 1/9.

Tex., San Antonio—LIGHTING—City P. Service Bd., Navarro and Villita Sts., street lighting modernization or "White Way" program, **$350,000;** exten. some residential sec. street lighting. **$150,000.**

Utah, Salt Lake City—PARKING RAMP—Zion's Securities Corp., Union Pacific Bldg. Annex, parking ramp. **$200,000.** Desert Architect & Engineers, Zion's Security Bldg., consult. engrs.

† **Washington**—NIKE INSTALLATION—U. S. Eng., 4735 E. Marginal Way, Seattle, battallion headquarters bldg., at Nike installation, Midway, **$100,000,** Bids in April; gap fillter station, Ione, **$150,000,** Bids in March; battallion headquarters bldg. at Nike installation, Redmond, **$100,000,** Bids in April.

▲ **Wis., Milwaukee**—CARGO TERMINAL, etc.—Harbor Comn., City Hall, 500x1,000 ft. steel sheet piling substructure, 2 transit sheds 150x500 ft., railway tracks, paving, general cargo terminal, S. Pier No. 2, **$4,000,000.** CD 6/23/50.

Newfoundland, Bonavista—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf, **$100,000.** J. P. Carriere, c/o owner, consult. engr.

Newfoundland, Milltown—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf. **$100,000.** J. P. Carriere, c/o owner, consult. engr.

Newfoundland, Springdale—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. wharf reconstr. **$100,000.** J. P. Carriere, c/o owner, consult. engr.

Ont., Beechville—RAILWAY SIDINGS—Canada Cement Co., Phillips Sq., Montreal, Que., 5 railway sidings to plant. **$100,000.**

P. E. I., Charlottestown—HARBOR IMPRVS.—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., harbor imprvs., Wood Islands, **$100,000.**

Que., Blanc Sablon—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf exten. **$150,000.**

Que., Mechins—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf reconstr. **$100,000.**

ATLAS
CONVEYING AND
LOADING EQUIPMENT

DEPENDABLE
LOW COST...

... Safer, Faster, Smoother Handling of Materials

Atlas Conveyors set the pace for efficient and low cost handling of sand, gravel, cement and other aggregates. Their advanced design means strong and sturdy construction, ease of operation, and control as well as lower operating and maintenance costs.

When dependable conveying and loading equipment is needed, be wise — ask for Atlas.

Write for Model 24 Literature Today!

ATLAS CONVEYOR CO., CLINTONVILLE, WISCONSIN, U.S.A.

Manufacturers of portable and stationary conveyors and bucket elevators for handling loose material such as sand, gravel, crushed stone, coal, coke, cement, etc.

On highway construction, road maintenance, ditching, terracing, finish grading, spreading road mix, land leveling, Adams 660 gives you the extra power, speed, and stamina to do all of these jobs faster, better, and at lowest cost.

Here's Why you should check the ADAMS 660 against your present heavy-duty graders

A lot has happened to the BIG grader field in the last year or two. For instance, if you have one of the 115 hp competitive graders that were "BIG" a few years ago, Adams 660 can now give you . . .

1. 30% more horsepower for deeper cuts, harder materials, faster cycles.
2. 29% more weight on drive wheels to apply more power, get more work done faster.
3. 35% higher travel speed to cut nonproductive time between work assignments.
4. 117% higher reverse speed for more cycles per hour on shuttle grading.
5. 33% extra forward-speed-selection of power to match your load. With optional creeper gears, 83% extra choice in geared speeds (¼ to 26 mph) for increased accuracy and more effective application of power to difficult work.
6. 100% additional backing-speed selection that cuts waste time on return cycles, improves production on back-up grading.
7. 19% more front-axle clearance to work larger windrows and come in and out of ditches without interference.

In addition, all gears in the "660" constant-mesh transmission are on antifriction bearings for easy operation, less wear, less maintenance cost. Adams rubber-mounting of engine keeps vibration from traveling to machine and operator. Automatic braking of "660" transmission, when applying hydraulic brakes to wheels, gives you safer operation with less wear on brake linings, and less pedal effort. Because "660" power-box clutches shift on ball bearings, you have less wear . . . easier, smoother-operating controls.

It's a good time now to review your grader equipment, a good year to make needed replacements before the big rush comes to fill needs of the huge expansion in new federal-financed highway construction. We'll be glad to help you make a fair and realistic analysis of your grader equipment and grader needs. We'll be glad to give you every opportunity to compare the Adams 660 . . . or smaller models . . . with your present equipment or with *any* competitive grader.

Wouldn't *now* be a good time to talk it over? We can give you better deliveries and better deals now than we can later on . . . that is, if we can prove to you that we have the best grader for *your* work, and if you decide that now is the time for *you* to buy.

Multiply the uses of your Adams grader with optional equipment: Scarifier, for ripping old asphalt and hard-packed surfaces; Bulldozer, for pushing debris from grade, backfilling around culverts, etc.; "V" Snow Plow and Wing, for cleaning highways and country roads of snow and ice; and Elegrader, for plowing and loading, or sidecasting materials.

A size ADAMS for every need

Model 660—150 hp diesel engine, 27,730 lbs.

Model 550—123 hp diesel engine, 23,500 lbs.

Model 440—104 hp diesel engine, 21,500 lbs.

Model 330— 80 hp diesel engine, 20,500 lbs.

TraveLoader — A high-speed, heavy-duty, self-propelled, belt-type loader for picking up materials and loading into trucks from windrows or stockpiles, 55 hp gasoline or 60 hp diesel engine, 16,800 lbs.

AG-29-G-b

LeTourneau-WESTINGHOUSE Company

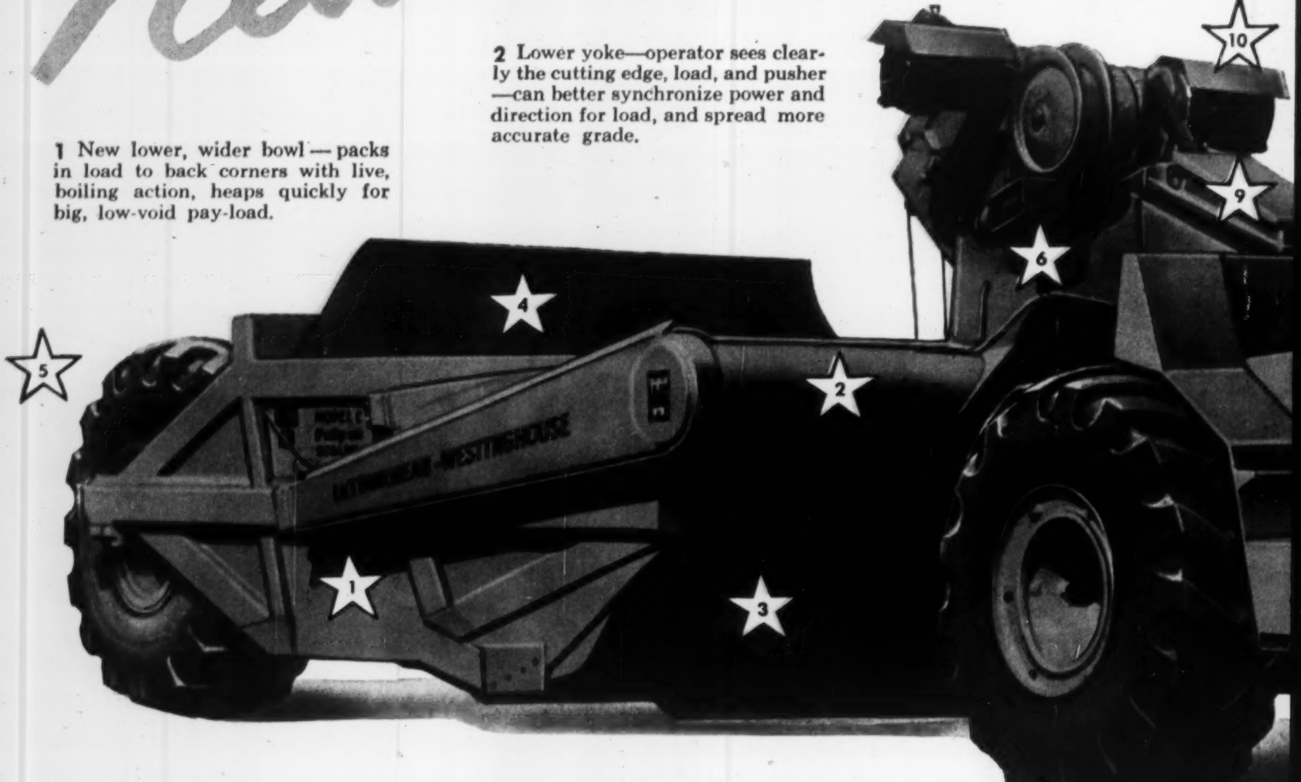
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

◀ Low, wide bowl of Fullpak Scraper with 9½' blade gives live, boiling action that quickly fills back corners, heaps high fast for big payloads.

Fullpak Scraper is ruggedly built, with double-steel bottom reinforced by welded steel filler-channels. Box-beam construction reduces dead-weight, increases strength. Sturdy push-block (43" x 16") pushing directly to blade through scraper-bottom, maintains contact with pusher over rough or bumpy ground. ▶

New Model C Fullpak



2 Lower yoke—operator sees clearly the cutting edge, load, and pusher—can better synchronize power and direction for load, and spread more accurate grade.

1 New lower, wider bowl — packs in load to back corners with live, boiling action, heaps quickly for big, low-void pay-load.

3 High apron-lift (6'1") means fast, easy unloading of chunky materials and rocks.

4 Positive forward-ejection of load, wipes bowl clean of all materials, including mud and sticky clay.

5 Low push-block matches height of crawler-tractor push-plates, applies power in direct line with cutting-edge to utilize full horsepower and tractive effort.

6 Quick-release clutch on scraper, with fast electric hoist, permit rapid "pumping" action of bowl, for speedy loading of loose materials.

7 Powerful 208 hp C Tournapull prime-mover—with constant-mesh, or sliding-gear transmission — has speeds to 30 mph.

8 Exclusive, power-transfer differential matches pull to traction, makes Tournapull best "mudder" in the earthmover field.

Tournapull, Rooter—Trademark Reg. U.S. Pat. Off., Fullpak—Trademark

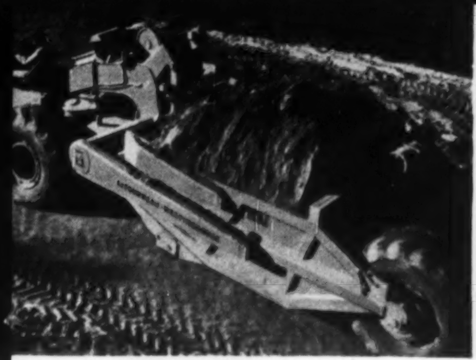
Tractors

Rear-Dumps

Graders

TraveLoaders

Bottom-Dumps, Cranes, Flat-Beds, Elegraders, Rollers, Snow Plows, Logging Arches and Skidders, Scrapers and PCU's,' Rooters, Root Rakes, Wire Rope



Curved deflector-plate on top of tailgate, together with curved apron, give best boiling action for fast heap, eliminate spill, help fill corners. Wheels inside cutting edge make precision work possible next to banks and on slopes.

Big 208 hp Model C Tournapull prime-mover with Fullpak Scraper makes 180° turn in 31′ 2″, rides on 4 big 26:5 x 25, 26-ply rating, low-pressure tires, travels up to 30 mph over highways and cross-country.

Scraper

18 cu. yards heaped

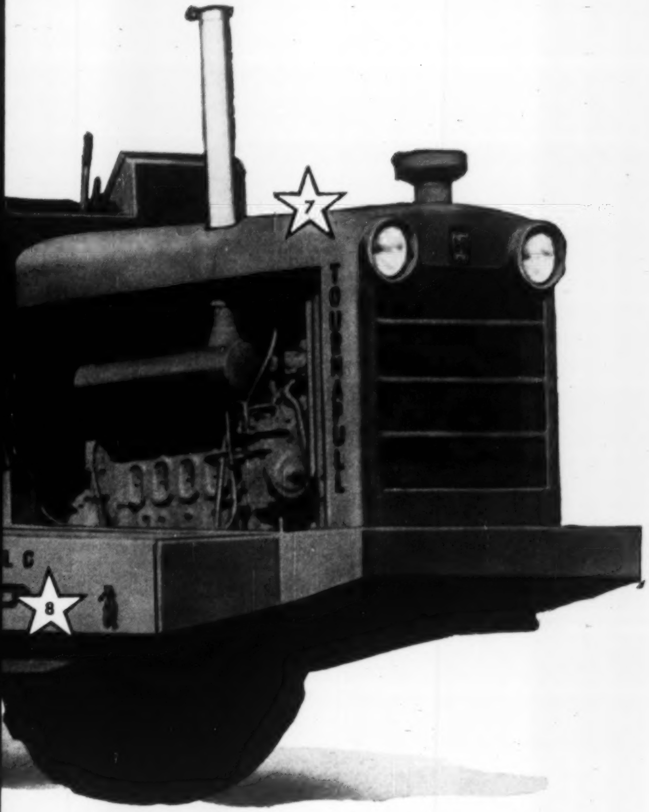
Loads faster... boils better...

You've never seen a scraper that loads as *easy* and heaps as *fast* as this new LeTourneau-Westinghouse Model C Fullpak Scraper.

New Fullpak low, wide bowl, loads up to 18 cubic yards heaped capacity with minimum of loading resistance. Low push-block matches height of tractor push-plates. Direct line application of power from pusher to blade, makes easier, faster loading.

The "low and wide" design of this new Fullpak Scraper helps get more "boiling" action, makes it easy to fill back corners as well as apron, packs in a big load *fast*. Wheels are inside cutting edge, for precision finish work next to banks and on slopes. Positive, forward ejection forces out sticky as well as dry material ... wipes bowl clean each load. High apron lift (6′1″) permits all material to be quickly and cleanly unloaded. Fullpak Scraper spreads in accurate lifts to meet any construction requirement.

Powerful, improved 208 hp Model C Tournapull prime-mover has the famous power-transfer differential that keeps pulling-traction on both drive wheels at all times ... also geared king-pin power steer that can turn 90° and "walk" Tournapull out of mud and loose sand that stalls ordinary prime-movers. You have top speeds to 30 mph, with choice of sliding-gear or constant-mesh transmission.



9 Power-steer on geared king-pin permits 90° turn, swings prime-mover side-to-side in soft going, placing drive-wheels on firm footing to "walk" out of mire.

10 Push-button control makes handling easy. Brushless, all-weather electric motors at point-of-action give instant steer-and-scraper control, minimize cable needs.

This new 18-yard, faster-loading Fullpak Scraper means more pay yards for you

Before you buy your next scraper, get full information on this new Fullpak 18-yard C Tournapull. Contact your local Distributor for complete details.

P-1024-G

LeTourneau-**WESTINGHOUSE** Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—BA

▲ **R. I., Providence** — WING — BA 2/21 — Providence Lying-In Hospital, Howard R. Marriam, pres., 50 Maude St., wing addn. $1,500,000. Howe, Prout & Elman, 17 Custom House St., archts. CD 11/9/53.

▲ **Mass., Wrentham** — SCHOOL — BA 3/9 — Towns Wrentham, Norfolk and Plainville, King Philip Regional School Dist., Selectmen's Office, Municipal Bldg., Wrentham, constr. King Philip Regional High School Rte. 140. $1,800,000. Plans deposit $50, refundable. Walter Gaffney, W. Main St., Hyannis, archt. Barnes & Jarnis, Inc., 51 Cornhill St., Boston, struct. engr. CD 9/14.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

M. **DeMatteo Constr. Co.**, Quincy, Mass. LB **$2,315,714.** Contr. No. 4, Northeast Expressway, Revere. Bids Feb. 7. CD 1/5.

▲ **East Brookfield Racing Assoc., Inc.**, John Coleman, pres., 85 Sprague St., Readville, Mass. Owner Builds. **$1,080,000.** race track Rte. 9, EAST BROOKFIELD, MASS. Linenthal & Becker, 16 Lincoln St., Boston, Mass., archts.

▲ **CONNECTICUT**—State Hy. Dpt., State Office Bldg., Hartford,

Conn.—**Frouge Constr. Co.**, 141 North Ave., Bridgeport, Conn., LB, **$3,937,164,** Proj. 311-03, c. conc. 2,509 lin. ft. Conn. Turnpike, incl. grade separation structures at Myrtle Ave., Warren St., Lafayette St., Broad St., Ramp "C" over North Frontage Rd., E. Main St. and Ramp "E" over Nichols St., Bridgeport;

Conn.—**A. J. Orlando Contg. Co.**, 151-59, Powel's Cove Blvd., Whitestone, N. Y. and **Edenwald Contg. Co.**, 151-45 Sixth Rd., Whitestone, N. Y., LB **$7,436,751.** Proj. 309-02, c. conc. incl. grade separation structures at Kings Hy., East and West, Meadowbrook Rd., Grasmere Ave., New England Ave. Exten., Sunset Ave., Black Rock Ave., structures A & B Chambers St., Brentwood Ave. and relocated Coolidge St., Fairfield;

Conn.—**Gull Contg. Co., Inc.**, 33-15 Lawrence St., Flushing, N. Y., LB, **$10,186,307,** Proj. 304-02, c. conc. 7,100 lin. ft., incl. grade separation structure at Greenwich Ave. and Rippowam River, McCullogh St., South and Guernsey Sts., Atlantic St., Canal St., Hawthorne St., Elm St., Lafayette St., N. Y., N. H. & H. R.R. and Myrtle St., Stamford. Bids Feb. 6. CD 1/18.

BUILDINGS—LB & CA

▲ **Rowley Constr. Co.**, 260 Central Ave., Pawtucket, R. I. LB **$1,142,000.** HOSPITAL WING, ATTLEBORO, MASS. Sturdy Memorial Hospital, Bd. Managers, 211 Park St., Attleboro, Mass. Bids Feb. 7. CD 1/4.

▲ **C. J. Maney Co., Inc.**, 173 Bedford St., Lexington, Mass. CA Approx. **$1,246,000.** Paulist CENTER, Park St., BOSTON, MASS. Missionary Society of St. Paul the Apostle, Paulist Fathers, 5 Park St., Boston, Mass. Bids Dec. 1. CD 1/24.

▲ **Wadhams & May Co.**, 15 Lewis St., Hartford, Conn., LB **$3,177,789,** Conrad HIGH SCHOOL, WEST HARTFORD, CONN. Town Bd. Educ., 51 Memorial Rd., West Hartford, Conn. Bids Feb. 7. CD 12/30.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 24 Pennsylvania
STREETS AND ROADS
February 21 Maryland February 23 New York
February 24 Pennsylvania

BUILDINGS—BA

▲ **N. Y., New York**—HOUSING—BA 3/6—New York City Housing Auth., 299 Broadway, Zone 7, (1) foundations and appurtenances (2) general constr. (3) foundations and general constr. (4) heating and ventilating (5) electrical work (6) plumbing for Frederick Douglass Houses (Proj. No. NYS-64-1) located in area bounded generally by W. 104 St., Manhattan Ave., W. 100 St. and Amsterdam Ave. $30,000,000. Plans deposit $75; furnishing, installing elevators. Plans deposit $25. CD 4/4.

HEAVY CONSTRUCTION—LB & CA

▲† **Peter Kiewit Sons Co.**, 1024 Omaha Natl. Bank Bldg., Omaha, Neb., **Condon-Cunningham, Inc.**, 4229 Lafayette St., Omaha, Neb., **S. J. Groves & Sons Co.**, Wesley Temple Bldg. and **Al Johnson Constr. Co.**, Foshay Tower, both Minneapolis, Minn. and six firms in Copenhagen, Denmark, CA **$18,176,836.** construction work at Thule and Sondrestromfjord Air Bases, GREENLAND. U. S. Eng., 346 Broadway, New York 13, N. Y.

▲† **Michael Contg. Co., Inc.**, 142-148 19 St., Brooklyn, N. Y., CA, **$1,068,717,** Sch. 3 plus all additives, Special AAA Facilities, Summit, NEW JERSEY. U. S. Eng., 111 E. 16 St., New York 3, N. Y. CD 12/19, under LB.

BUILDINGS—LB & CA

▲ **Edward Corning Co.**, 204 E. 39 St., New York 16, N. Y. CA **$2,079,000.** (6 bidders) general constr. Baldwin High SCHOOL, BALDWIN, N. Y. Bd. Educ., Union Free School Dist. No. 10, town of Hempstead, Baldwin High School, Pershing Blvd., Baldwin, N. Y. CD 1/16, under LB.

▲ **George F. Driscoll Co. & Moccia Constr. Co.**, 401 E. 42 St., New York 17, N. Y. CA **$4,994,000.** (11 bidders) foundations and general constr. for **Mill** Brook HOUSES Proj. No. NYS-65 Sec. I, incl. Bldgs. Nos. 5 to 9 (inclusive) area bounded generally by E. 137 St., Cypress Ave., E. 135 St. and St. Ann's Ave., Bronx Boro, NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y. CD 1/16, under LB. Grand total $6,224,505;

Harry Starkman & Bros., 348 Brook Ave., New York 54, N. Y. CA **$530,220.** (5 bidders) heating and ventilating work (New York, N. Y.).

Jesse E. Kahn & Co., 131 W. 21 St., New York 11, N. Y. CA **$700,285** (9 bidders) plumbing work (New York, N. Y.).

▲ **Joseph-Martin Homes**, c/o Herman York, archt., 90-04 161 St., Jamaica, N. Y. Owner Builds. **$8,000,000.** 400 HOUSES on 98 acre tract at South Oyster Bay Rd. and Terrehans Lane, SYOSSET, N. Y.

▲ **Levitt House**, 168-11 Powell's Cove Blvd., Whitestone, N. Y. Separate Contracts. Est. **$10,000,000.** forty, 8 story APARTMENTS, on 30 acre tract bounded by Little Neck Bay, 162 St., Powell's Cove Blvd. and 12 Ave., WHITESTONE, N. Y. Alfred Levitt, c/o owner, archt. George Miller, 125 W. 45 St., New York 19, N. Y., consult. archt. CD 2/6.

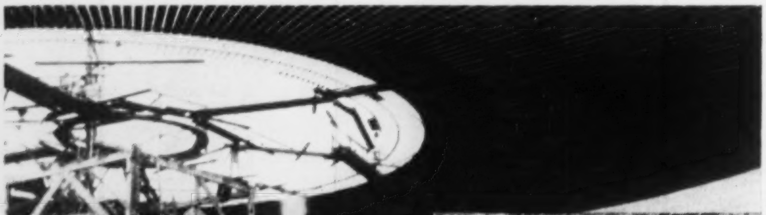
▲ **Joseph L. Muscarelle, Inc.**, 42 First St., Hackensack, N. J., CA, Est. **$1,000,000,** 1 story WAREHOUSE and OFFICE, Fairlawn Industrial Park, FAIRLAWN, N. J. Scott, Foresman & Co., 120 E. 23 St., New York 10, N. Y. Peter Holley, 195 Van Houten St., Paterson, N. J., archt.

▲ **Spera Constr. Co.**, 1719 N. Front St., Harrisburg, Pa. CA **$1,200,000.** 10 story, brick, steel OFFICE first two floors 85x195 ft., upper floors 64x100 ft., Second and Reily Sts., HARRISBURG, PA. John N. Hall, 112 N. Second St., and Joseph J. Spera, 1719 N. Front St., Harrisburg, Pa. Starr & Long, 410 N. Second St., Harrisburg, Pa., archts. Awarded Feb. 2.

SOUTH

HEAVY CONSTRUCTION—BA

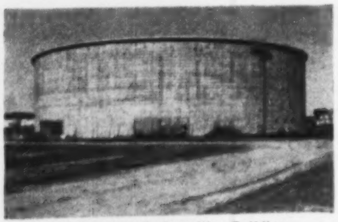
STATE HIGHWAY LETTINGS
BRIDGES
February 21 North Carolina February 29 Virginia
STREETS AND ROADS
February 21 North Carolina February 29 Louisiana
February 29 Virginia



Start of precast slab placement.

THIS PRELOAD ROOF MAY BE YOUR ANSWER!

Previously placed slabs form working surface.



Exterior of 294 ft. Exposition Building—Montevideo, Uruguay.

If you want a large diameter roof without supports except at the edge and with clear unobstructed space below from wall to wall—use this suspended PRELOAD roof. Unlike the poured-in-place PRELOAD Prestressed Concrete Dome Roof, precast slabs are laid on radial cable strands, shown in place above a 294 ft. diameter exposition building. This roof may be used on any large circular structure such as a tank, stadium, gymnasium, shopping center, etc. Cost is low, construction rapid, maintenance nil.

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- 20 years of PRELOAD experience in design and construction of roofs, tanks, bridges, etc. of prestressed concrete.
- PRELOAD structures mean low ULTIMATE cost, long life, low maintenance, no deterioration.
- Construction directly by PRELOAD or through local licensees to assure maximum economy.
- PRELOAD supervision insures that every job, large or small, is RIGHT in design, material, workmanship.
- Technical data and literature on request.

PRELOAD
TRADE MARK

The Preload Company, Inc.
211 EAST 37th STREET
NEW YORK 16, N. Y.

HEAVY CONSTRUCTION—LB & CA

▲† **MacDougald Constr. Co.,** 1625 Northside Dr. N. W., Atlanta, Ga., CA **$1,786,682,** runway rehabilitation and exten. NOY 91120, BEAUFORT, S. C. P. Wks. Officer, Dpt. Navy, Naval Base, Charleston, S. C. Bids Jan. 31. CD 2/8, under LB.

▲† **Roberson Constr. Co.,** 1513 Lyon St., Columbia, S. C. CA **$1,223,100.** two organizational maintenance hangars, Myrtle Beach Air Force Base, No. 38-081-56-41, MYRTLE BEACH, S. C. U. S. Eng., 31 Customhouse, Charleston, S. C. Bids Jan. 25. CD 2/1, under LB.

▲† **Al Johnson Constr. Co.,** Foshay Tower, Minneapolis, Minn., LB **$3,384,666.** indoor power house on existing substructure, with necessary equip. incl. spillway, emergency bulkhead, storage yard, structural steel tower, Cheatham Lock and Dam, TENNESSEE. U. S. Eng., 306 Federal Office Bldg., Nashville, Tenn. Bids Feb. 7. CD 1/24.

BUILDINGS—LB & CA

▲ **M. T. Broyhill & Sons Corp.,** 2125 19th St. N., Arlington, Va. Owner Builds. **$1,200,000.** 200-unit APARTMENT, S. Glebe Rd., Shirley Park, ARLINGTON, VA. Corning & Moore, 1726 M St. N. W., Wash., D. C., archts.

▲ **North Beach Constr. Co.,** 941 N. E. 79 St., Miami, Fla., CA, **$7,500,000.** 650 HOMES and SHOPPING CENTER, near Patrick Air Force Base, COCOA BEACH, FLA. Taylor Made Homes, J. Taylor, pres., 941 N. E. 79 St., Miami, Fla. Carlos B. Shoeppl, 2701 Biscayne Blvd., Miami, Fla., archt.

▲ **Witters Constr. Co.,** 1397 S. E. 10 Court, Hialeah, Fla., LB, OFFICE bldg., 1688 Meridian Ave., MIAMI BEACH, FLA. Meridian Ave. Corp., H. Horowitz, c/o Donald J. Reiff, archt., 600 Lincoln Rd., Miami Beach, Fla. Bids Jan. 23. CD 1/17.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
February 21 Michigan

STREETS AND ROADS
February 21 Michigan

BUILDINGS—BA

▲ **O., Cincinnati** — SHOPPING CENTER — BA 3/1 — Walters Bros., 7911 Reading Rd., shopping center, Winton Rd. and Hemstead Dr. $2,000,000. Extended date. Cordes, Pressler, Houck & Assoc., 4939 Paddock Rd., archts. Beineke & Ruehlmann, 626 Broadway, engrs. CD 1/10.

▲ **Ind., Frankfort**—CANDY PLANT—BA 3/2—Peter Paul, Inc., 600 S. Michigan St., Chicago, Ill., 1 story, 392x536 ft. candy plant, $3,200,000. Daggett Naegele & Daggett, 567 W. Westfield Blvd., Indianapolis, archts. CD 9/6.

HEAVY CONSTRUCTION—LB & CA

▲ **McManus & McCarthy, Inc.,** 416 Benson St., Reading, O. CA **$1,275,510,** est. $1,500,000. east branch of Ohio River Interceptor, Sect. No. 1 and McLean Ave., Interceptor, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Jan. 31, awarded Feb. 6. CD 2/6, under LB.

▲† **W. B. Gibson Co., Inc.,** 200 Chestnut St. N.E., Warren, O., LB **$1,010,098 (A)** hangar with shops and misc. facilities, LB **$1,139,331,** combined bid, Youngstown Municipal Airport, ENG-36-058-56-10, YOUNGSTOWN, O. U. S. Eng., 925 New Federal Bldg., Pittsburgh 19, Pa. Bids Feb. 2. CD 1/5;
Graziano Constr. Co., Inc., 7321 Frankstown Ave., Pittsburgh, Pa., LB **$74,700 (B)** pumping station and facilities (Youngstown, O.);
Moyer Bros., 2605 Beale Ave., Altoona, Pa., LB **$48,514 (C)** water storage reservoir and misc. work (Youngstown, O.)

▲ **M. J. Boyle Co.,** 2840 Elston St., Chicago, Ill., LB **$1,193,998,** West Side Subway, Congress St. Station and LaSalle St. Station changes, CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Jan. 26. CD 1/11.

▲ **MICHIGAN**—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,
Mich.—**Sargent Constr. Co.,** 2840 Bay Rd., Saginaw, Mich. LB **$2,235,834,** est. $2,500,000. (10 bidders) dual c. conc. wid'n. 10.625 mi. M-78 and US-27 from Davis Hy. to Packard Rd. bridge over Thorn-Apple River, M 23-17 C14 RN, etc., Eaton Co.;
Mich.—**W. F. McNally Co.,** Bridgeport, Mich. LB **$108,626,** est. $110,000. (13 bidders) c. conc. wid'n. with b. con. surf. 1.042 mi. M-46 in Breckenridge village, F 29-10 C4-U, etc., Gratiot Co.;
Mich.—**E. W. Graft Constr. Co.,** 2870 Harrison St., Saginaw, Mich. LB **$128,114,** est. $120,000. (8 bidders) c. conc. wid'n. 0.451 mi., US-23 west of Michigan Ave. to East of Water St., F 6-12 C4-U (F 151 6), Arenac Co. Bids Jan. 27. CD 1/11.

BUILDINGS—LB & CA

▲ **Brown Constr. Co.,** Massillon, O., CA Est. **$1,000,000.** 65,000 sq. ft. FACTORY addn., incl. 2 automatic smokehouses, new lard dpt., air-conditioned room for slicing and packaging luncheon meats and tripling size of bacon dpt., CANTON, O. Sugardale Provision Co., 1018 McKinley St. S.W., Canton, O. Awarded Feb. 1.

▲ **Penker Constr. Co.,** 1030 Summer St., Cincinnati, O. CA **$1,500,000.** 1 story, 125,000 sq. ft. brick, steel mfg. PLANT and KILN, Seymour Ave., CINCINNATI, O. Briggs Mfg. Co., Buhl Bldg., Detroit 25, Mich. Awarded Feb. 3. CD 12/22.

▲ **Sunset Development Co.,** c/o W. A. Carroll, 5724 Lester St., Cincinnati, O. Own Forces. **$1,500,000.** forty-seven 1 and 1½ story, brick, bsmnt. HOMES, off Riddle Rd., WYOMING, O. Rosendahl & Brown, 3428 Edwards St., Cincinnati, O., archts. Morelidge & Morelidge, 104 W. 4th St., Cincinnati, O., engrs. Awarded Feb. 2.

▲ **Paul Schleicher,** 541 Washington St., Gary, Ind., CA, **$3,500,000,** 200 HOMES, GARY, IND. South Gary Homes, Inc., 541 Washington St., Gary, Ind.

▲ **Quinn Home Builders,** 8046 S. Western St., Chicago, Ill., Own Forces. **$3,600,000.** 200 HOMES, S. Sawyer Ave. at 79 St., CHICAGO, ILL.

▲ **John E. Birch & Co.,** 3331 Oak Park Ave., Berwyn, Ill., Own Forces, **$1,600,000.** 100 HOMES, LOMBARD, ILL.

WEST OF MISSISSIPPI

BUILDINGS—BA

▲ **Minn., Worthington**—SCHOOL—BA 3/7—Bd. Educ., V. E. Brown, clk., constr. Senior High School, $1,300,000, H. Spitsnagel & Assoc., Sioux Falls, S. D., archts. CD 9/9/54.

▲ **Tex., Deer Park**—PLANT—Bids Asked—Rohm & Haas, Deer Park, plastic products plant. $12,500,000. CD 6/3/54.

HEAVY CONSTRUCTION—LB & CA

▲† **Fred R. Comb Co.,** 2901 Aldrich Ave. S., Minneapolis, Minn., CA **$1,844,000.** constr. buildings operational, Grand Forks Air Force Base, ENG-25-065-56-42, GRAND FORKS, N. D. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Jan. 24. CD 1/27, under LB.

▲† **J. F. White Eng. Corp.,** 6999 W. Colfax Ave., Denver, Colo., CA **$1,526,029.** central heating plant, high temperature hot water distr., Grand Forks Air Force Base, Inv. 25-066-56-49, GRAND FORKS, N. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 25. CD 1/30, under LB.

† **Peter Kiewit Sons Co.,** 1024 Omaha Natl. Bank Bldg., Omaha, Neb., CA **$2,703,969,** airfield pavements, Ellsworth Air Force Base, Inv. 25-066-56-31, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 26. CD 1/31, under LB.

▲† **Weitz Co., Inc.,** 406 Fleming Bldg., Des Moines, Iowa, CA **$1,365,300,** Schedule 1, modifications of wing hangars, Ellsworth Air Force Base, Inv. 25-066-56-27, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 19. CD 1/24, under LB.

TEXAS NATIONAL BANK
Houston, Texas
Architect:
Kenneth Franzheim
Lobby finished with perlite acoustical plaster over perlite base coat. Exterior aluminum curtain walls are backed with sprayed perlite concrete.

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THOMSON-PORCELITE PAINT CO., PHILA. 6, PENNA.

Welfare Island Bridge, east pier 200 Greenheart piles in fender system. Knappen, Tippetts, Abbett & McCarthy: Designers for New York City Dept. of Public Works

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STRENGTH—Greenheart f3300 psi

DURABILITY—Up to 80 yrs. service

COST — Compares favorably with treated wood on a strength basis. No preservative treatment required.

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▲† **Abel, Dobson & Robinson,** 312 First Natl. Bank Bldg., Lincoln, Neb., CA **$1,507,742,** addnl. FY 56 airfield paving, Lincoln Air Force Base, Inv. 25-066-56-33, LINCOLN, NEB. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Jan. 26. CD 1/31, under LB.

▲† **H. B. Zachry Co., Constr. Div.,** Transit Tower Bldg., San Antonio, Tex., CA **$1,467,655,** est. $1,000,000-$3,000,000. runway extens., incl. 81,000 sq. yd. concrete pavement 10 to 19 in. thick, Abilene Air Force Base, ENG-41-443-56-55, ABILENE, TEX. U. S. Eng., Box 1600, Fort Worth, Tex. Bids Jan. 24. CD 1/26, under LB.

▲† **Detweilers, Inc.,** Twin Falls, Idaho. CA **$1,283,336.** central high-temperature hot-water heating plant, heating distr. sys., Air Force Base, ENG-45-164-56-14, GLASGOW, MONT. U. S. Eng., City-County Airport, Walla Walla, Wash. CD 1/16, under LB.

▲† **Brodie Constr. Co.,** Box 2064, Amarillo, Tex. LB **$3,221,227,** est. $1,000,000-$3,000,000. Bonito Water transmission lines, approx. 80 mi. gravity water line 10- to 22-in., appurtenances, Holloman Air Force Base, ENG-29-005-56-15, ALAMOGORDO, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Jan. 31. CD 12/30.

BUILDINGS—LB & CA

▲ **Fegles Constr. Co.,** 711 Wesley Temple Bldg., Minneapolis, Minn., LB **$1,607,600,** est. $1,000,000-$4,000,000. Proj. No. 360, PACKHOUSE and CEMENT STORAGE FACILITIES, HOUSTON, TEX. Ideal Cement Co., Gulf Div., San Jacinto Bldg., Houston, Tex., and Denver National Bldg., Denver, Colo. Bids Jan. 25. CD 1/11.

▲ **Alexander & Kingbay,** 4641 Hiawatha Ave., Minneapolis, Minn. CA Est. **$5,000,000.** SHOPPING CENTER, on 31 acre plot, incl. Sears, Roebuck Co. store with 105,000 sq. ft., theater, total 325,000 sq. ft. for all stores in unit, BILLINGS, MONT. Henry Shanedling Sons Corp., 2025 Nicollet Ave., Minneapolis, Minn. Thorshov & Cerny, Inc., Metropolitan Bldg., Minneapolis, Minn., and Walter Kuetzing, Hart-Albin Bldg., Billings, Mont., archts. CD 1/9, under CA.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 29 California
STREETS AND ROADS
February 24, 29, March 1 California

▲† **California**—BA 3/20—U. S. Eng., 1209 8 St., Sacramento, dredging in Prospect Slough-Liberty Island area north of Rio Vista in Sacramento River $1,750,000. CD 1/16.

HEAVY CONSTRUCTION—LB & CA

▲ **California**—State Div. Hys., 120 S. Spring St., Los Angeles,
Guy F. Atkinson Co., 10 West Orange Ave. South San Francisco, Calif., CA, **$2,062,928,** grading, paving 2.4 mi. and constr. 1 welded structural steel and 3 rein.-con. bridges SSR 94 between Wabash Freeway in San Diego and 0.6 mi. east of Euclid Ave., San Diego Co. Bids Jan. 26, awarded Feb. 3. CD 1/30, under LB.

CANADA

BUILDINGS—BA

▲ **Ont., Hamilton**--COURT HOUSE, etc.—BA 2/23—Joint Court House Comm., c/o Prack & Prack, archts., 310 Main St. E., structural steel only for 5 story, bsmnt., 151x210 ft., steel, stone, masonry, brick court house and registry office. Total est. $2,500,000. CD 3/9.

HEAVY CONSTRUCTION—LB & CA

▲ **ALBERTA**—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.,
Standard Gravel & Surfacing of Canada Ltd., 5340 First St. S.W., Calgary, Alta., LB, **$2,074,440.** grading, culverts, base course and prime 6.8 mi. Trans-Canada Hy., Banff National Park, Banff. CD 12/1/43.

BUILDINGS—LB & CA

▲ **S. D. Miller & Sons,** 6999 Cote des Neiges Rd., Montreal, Que., CA **$2,500,000.** 6 story, 16,000 sq. ft., rein.-con. OFFICE, Decarie Blvd. traffic circle, MONTREAL, QUE. Syndicate, c/o Leo Berko, c/o Stan R. Shenkman, assoc. archt., 3777 Cote des Neiges Rd., Montreal, Que. Awarded Jan. 25.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Guatemala**—BA 3/16—Departamento de Bienes Nacionales, Licitaciones y Asuntos Alemanes, 14 Calle, No. 3-60, Guatemala City, 240 meter bridge for the Atlantic Hy. at Rio Las Vacas. Extended date. Tippetts-Abbett-McCarthy-Stratton, 52 W. 47 St., New York, N. Y., U. S. A., and Gibbs & Hill, Inc., Penna. Station, New York, N. Y., U. S. A., engrs. CD 12/27.

BUILDINGS—LB & CA

▲ **Allis-Chalmers Mfg. Co.,** 1953 Thomas St., Milwaukee 1, Wis., U. S. A., CA est. **$4,500,000.** FLOUR MILL, near PORT-AU-PRINCE, HAITI. Caribbean Development Co., :/o contractor.

(Proposal Advertisements see p. 283 to 285)

Prestressed Pricing Gets More Competitive

Average Unit Prices For Prestressed Concrete Bridges

Prices per square foot of deck are average for the complete structure except in footnotes where superstructures are added

					Prestressed Concrete Low Bid			Conventional Design Low Bid		
Name and Location of Bridge	#	Length	Width	Spans For Prestressed concrete	Total	per sf of deck	Type	Total	per sf of deck	Type
Pinellas-Manatee, Fla	1	17,400′	37′5″	363 @ 48′	$3,325,000	$5.10[a]	PB	$3,510,000	$5.38	RC
Gandy, Fla	2	13,771′	30′4″	252 @ 48′ 20 @ 72′	2,600,214	6.22[b]	PB	2,624,808	6.39	RC SS
Lake Pontchartrain, La.	3	125,440′	34′0″	2,240 @ 56′	27,600,000	6.47[c]	P	35,017,507	8.21	RC
Richardson Bay, Calif.	4	1,440′	91′4″	18 @ 80′	3,017,420	22.94[d]	PW	no bids	.....	na
Hamptons Roads, Va	5	9,400′	36′0″	180 @ 50′	3,205,951	9.47	P	3,711,299	10.97	SS
Broad River, S. C.	6	4,480′	31′6″	64 @ 70′	1,922,733	13.62	P & PW	2,219,803	15.73	na
Great Egg Bay, N. J.	7	3,400′	32′6″	85 @ 40′	2,298,788	20.80[e]	P	2,333,058	21.11	na
Wisner Drive, La.	8	1,420.5′	56′10″	23 @ 60′ 1 @ 42′	806,164	9.99	PB	no bids		RC
Manatee, Fla	9	2,225′	62′0″	30 @ 66′	1,388,328	9.70[e]	PB	1,673,046	12.13	SS
Palma Sola, Fla.	10	3,696′	37′5″	72 @ 48′	1,314,657	9.51[f]	PB	no bids		RC

PB—post-tensioned bars P—pretensioned strands
PW—post-tensioned wires

[a] incl P/C sub and superstructures only
[b] incl steel channel span, 74′-86.5′-74′ @ $16.22/sf of deck
[c] incl capitalized maintenance cost for struct steel #3—1,500,000 #7—$37,000
[d] high-level bridge, requires major piers and piles
[e] incl central steel span, 70′-105′-70′
[f] incl 243′ bascule span

Prestressed Concrete Superstructure Prices

Bridge #	Cost/sf of deck Total	Cost/sf of deck Superstructure
1 complete	$5.10	$3.43
2 complete	6.22[b]	not avail
48′ span	4.75	3.03
72′ span	11.86	5.75
9 complete	9.70[e]	4.55
10 complete	9.51[f]	3.24

Curzon Dobell, President
The Preload Company, Inc.
New York, N. Y.

On ten recent prestressed concrete bridges contract prices for the complete structures range from $5.10 to $20.80 per sq ft of deck. These are from 17 cents to $2.43 per sq ft under competing bids on conventional designs, reinforced concrete and structural steel. The prices are described in the accompanying table. For superstructures alone the prestressed prices range from $3.03 to $5.75 per sq ft of deck.

Two complete comparisons of cost for prestressed concrete, structural steel and reinforced concrete result from bids taken November 22, 1955 by the Florida State Roads Department for bridges in Manatee County:

• Manatee River Bridge—2,225 ft by 62 ft, H20-S-16 Loading. Two basic alternate designs are:

I—Structural steel, 26 spans of 72 ft each, with eight 36-in. flange steel girders simply-supported.

II—Prestressed concrete, 30 spans of 66 ft each with ten 48-in. prestressed precast concrete girders with composite cast-in-place deck. This prestressed concrete alternate provided two optional designs:

1. Post-tensioned precast girders using the Stressteel bar wedge anchored system. (This produced the contract price of $9.70 per sq ft of deck for the complete job. The superstructure alone averaged $4.55 per sq ft of deck.)

2. Combined pretensioned-post-tensioned girders of the same cross section, using ⅞-in. strand for pretensioned straight units and Freyssinet anchored parallel wires for draped units.

Features common to both designs were:

Structural steel center spans of 70 ft + 105 ft + 70 ft.

Deck of two 26-ft roadways with a 4-ft media strip and a 3-ft curb and sidewalk on each side.

Piers founded on 20-in. square piles of reinforced concrete or pretensioned-prestressed concrete at contractor's option.

This is the bidding range:

Hardaway Contr. Co.	No Bid	SS
Columbus, Ga.	$1,338,329	P/C
Foster & Creighton	1,673,046	SS
Nashville, Tenn.	1,522,412	P/C
Massman Constr. Co.	No Bid	SS
Kansas City, Mo. ..	1,676,286	P/C
Industrial Constr. Co.	1,803,523	SS
Fort Lauderdale, Fla.	1,721,173	P/C

• Palma Sola Bridge—3,696 ft by 37 ft 5 in., H20-S-16 Loading. The three alternate designs with five options on the third are:

I—Cast-in-place reinforced concrete, 96 spans of 36 ft, monolithic slab and four girders 3 ft deep.

IA—Precast reinforced concrete longitudinal half sections, same spans and cross section as I.

IB—Prestressed concrete, 72 spans of 48 ft, precast prestressed girders with composite cast-in-place deck with these five options:

1.—Six post tensioned girders using stressteel wedge anchored units with transverse post-tensioning through precast diaphragms at two points in the span length.

2. Six pre-post-tensioned girders using ⅞-in. strand for straight and Freyssinet anchored parallel wires for draped units with transverse post-tensioning through precast diaphragms at two points in the span length.

3. Five pretensioned girders using ⅞-in. strand with cast-in-place reinforced concrete diaphragms at two points in the span length.

4. Four post-tensioned girders using Stressteel wedge anchored units with transverse post-tensioning through precast diaphragms at two points in the span length. (This option took the contract at $9.51 per sq ft of deck for the complete structure. For the superstructure only the price averaged $3.03 per sq ft of deck.)

5. Four pre-post-tensioned girders using ⅞-in. strand for straight and Freyssinet anchored parallel wires for draped units with transverse post-tensioning through precast diaphragms at two points in the span length.

Features common to all alternates are:

A central steel bascule span of 243 ft.

Deck composed of two 12-ft roadways and 6-ft curb and sidewalk each side.

Pile bent foundations using 20-in. and 18-in. square piles, either pretensioned or reinforced concrete at contractor's option, with cast-in-place reinforced cap.

No bids were received on options I and IA. The bid spread on prestressed concrete is:

Hardaway Contr. Co., Columbus, Ga...... C	$1,314,657
Powell Bros., Inc., Fort Lauderdale, Fla.	$1,420,078
Bay Dredging & Contr. Co. Tampa, Fla............	$1,493,648
Massman Constr. Co., Kansas City, Mo.......	$1,505,495

Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Feb 23 — Wood Products, Glass, Explosives, Chemicals
- Mar 8 — Cement, Aggregates, Ready-mixed Concrete, Asphalt
- Mar 1 — Clay Products, Lime, Plaster, Paint, Roofing, Wage Rates, Building Board, Lath, Insulation

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES	PLATE CARBON STEEL	REINF BARS billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$4.60	$4.50	$4.65	$9.25	......	$94.50	$113.00	$5.825	$7.90	$5.625	......
Chicago Area	4.60	4.50	4.65	9.25	$5.45	94.50	113.00	5.825	7.90	5.625	......
Pittsburgh Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	$11.50
Buffalo Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	11.50
Cleveland	......	......	4.65	9.25	5.45	......	......	......	......	......	11.50
Youngstown Area	......	......	4.65	......	......	......	......	......	7.90	......	......
Geneva	4.60	4.50	......	......	......	......	......	......	......	......	......
Los Angeles	......	......	......	......	5.45	......	......	......	7.90	......	......
Pueblo	4.90	5.35	5.10	......	......	......	95.00	5.825	7.90	5.625	12.40

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Rail steel	EXPANDED METAL LATHk Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATHk Std. ribbed 3.4 lb.
Atlanta	$7.63	$7.42	$7.42	$38.00‡	$42.00‡
Baltimore	7.63	7.06j	....	39.00	43.50
Birmingham	7.28t	7.08t	7.08t	51.00p	57.00p
Boston	8.13a	7.82	7.82	44.00	48.50
Chicago	7.43	6.23gu	6.23gu	49.00‡	60.00‡
Cincinnati	7.75ak	7.56rs	....	41.00mn	45.50mn
Cleveland	7.76	6.41e	....	41.00‡	45.50‡
Dallas	9.05	7.25	7.25	49.00	52.00
Denver	8.95	8.00c	....	54.00n	60.00n
Detroit	7.75	7.38	....	55.50	66.00
Kansas City	7.95a	7.75	....	49.00	60.00
Los Angeles	8.15fd	7.60	....	54.50	60.50
Minneapolis	7.79d	8.10b	8.10b	42.50	47.00
Montreal	7.70–8.15iC/7.75–8.15A	7.50/8.65i	7.50/8.65	46.00h	51.00h
New Orleans	....	7.05aks	....	44.50	49.50
New York	8.10	7.65y	7.65y	44.50no	51.00no
Philadelphia	8.04	7.14	....	42.50‡	47.00‡
Pittsburgh	6.98	7.37x	6.95	39.78	41.90
St. Louis	7.83s	6.75c	6.75c	57.00l	59.00l
San Francisco	8.55	7.55j	....	47.50	53.00
Seattle	5.35e	7.00cj	....	55.00nr	61.00nr
Toronto	8.40*	6.40	6.40	53.50nq	67.50nw

Quantity extras, per cwt: under 100#, +$6; 100–399#, +$3; 400–999#, +1.25; 1000–1999#, +30¢; 2000–4999#, base price; 5000–9999#, −10¢; 10,000–19,999#, −30¢; 20,000–29,999#, −50¢; 30,000# and up, −70¢

EXTRAS, per cwt—*Quantity: less than 700#, +50¢; 700–1499#, +25¢; 1500–7999#, +10¢. *Size†: #2 +$2.20; #3 +$1.10; #4 +80¢; #5 +62.5¢; #6, #7 +45¢; #8, #9, #10, #11 +35¢. *Bending: heavy, +80¢; light, +$2 (except in New York City and surrounding metropolitan area where bending must be done on the job). *Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–500 tons, +50¢ but not over $4500; 20–200 tons, +60¢ but not over $2000; 5–20 tons, +70¢ but not over $240; under 5 tons, +85¢ but not over $70. *Design only: +60¢.

WELDED FABRIC REINFORCING—Per 100 sq ft., carload lots fob mill

4 × 16 in., No. 5 & 10 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa..........$3.40

4 × 12 in., No. 8 & 12 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa..........$2.47

6 × 6 in., No. 6 & 6 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa..........$3.57

*‡ Delivered *a 2000–9999# *b 10,000–15,999#, fob city *c 20 tons or over *d 10,000–19,999# *e fob plant *f incl. delivering in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add dominion, provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p del. of 500 sq. yd. or more. *q 3¢ *r 2% off for cash *s 2,000–4,999# *t add 15¢ del. *u add 6.25¢ switch *v incl 15¢ del. *w 3.5¢ *x add 5¢ switch *y add 30¢ del. *z add 10¢ del. *A American made. *C Canadian made. † Number system replaces inch system of classifying bar sizes. New system is based on number of eighth inches in diameter of bar. ** Aver. of Canadian & American.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEXa	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 6" Pr Cl. 150	ASBESTOS CEMENT PIPE 12" Sew Cl. I	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T std. 8 in. s.s.	VITRIFIED SEWER PIPE std. 12 in. s.s.	VITRIFIED SEWER PIPE 24 in. ds.	VITRIFIED SEWER PIPE 36 in. ds.	CLAY DRAIN TILE ASTM C4-24 PER 1,000 ft., carload lots, f.o.b. 6 in.	CLAY DRAIN TILE 8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41 12 in.	CONCRETE SEWER PIPE 24 in.
Atlanta	113.6	$1.56	$2.60	$.545	$1.27	$4.82	$12.925			$0.90m	$3.40m
Baltimore	122.9	1.56	2.60	.595	1.1475	4.59v	12.095	$178.20	$274.80	1.01	2.75
Birmingham	109.3	1.56	2.60	.44	.81	3.55w	10.37w	260.00‡	440.00‡	1.25m	2.75m
Boston	125.5	1.58	2.39	.672qrt	1.29qrt	5.25qrt		197.40r	303.60r	1.54mq	3.65mq
Chicago	122.9	1.56	2.39	.90m	1.74m	6.25m	19.00m	150.00‡	270.00‡	1.00	3.65
Cincinnati	118.0	1.58	2.47	.665t	1.2825t	4.905t	12.505	240.00	370.00	.80m	2.95m
Cleveland	123.6	1.58	2.47	.539s	1.0395s	4.275t	11.275t	149.40m	231.60m	.85m	3.25m
Dallas	120.	1.58	2.73	.439	.799	4.00b	9.17b	......	......	.49	1.60
Denver	129.0	1.66	2.73	.45n	.78n	3.48n	......			.74m	2.50m
Detroit	123.9	1.58	2.47	.80	1.55	6.15	16.80	240.00m	370.00m	.95	3.82
Kansas City	120.7	1.58	2.47	.59	1.055	4.54	12.75	250.00	480.00	.90	2.90
Los Angeles	131.1	1.66	2.39	.67l	1.46l	5.97l	14.89l	228.20l	348.90l	.95	2.75f
Minneapolis	131.0	1.61	2.60	.78mo	1.42mo	6.25mo	......	......	......	1.66h	4.47h
Montreal				1.07u	1.73u	5.52u	8.93u			1.17h	3.11j
New Orleans	116.0	1.56	2.60	.51	.925	5.18	......	350.00p	550.00p	.75	2.50
New York	121.5	1.58	2.39	.85	1.62	6.33	16.49	......	......	1.15	3.00
Philadelphia	120.9	1.56	2.39	.65	1.25	4.95e	12.65e	300.00‡	350.00‡	1.60h	3.95h
Pittsburgh	124.7	1.58	2.39	.468m	.864m	3.86m	9.78m	152.00	244.00	1.05h	2.50h
St. Louis	119.3	1.56	2.47	.56	1.03	4.22	9.80	180.00l	380.00l	1.30hl	2.80hl
San Francisco	131.1	1.66	2.39	.74d	1.62d	6.59d	16.47d	235.00l	392.00l	1.05m	3.30m
Seattle	131.1	1.66	2.39	.65b	1.25b	6.29	17.75	200.00c		1.00k	3.10k
Toronto				.76	1.425	5.70	......	157.00	280.00	.87	3.05

*WROUGHT STEEL PIPE (Full standard weight)

Discount from list; see footnote

Mill	2½ & 3 in.; Butt Weld† Black %	2½ & 3 in.; Butt Weld† Galv. %	3½ to 6 in.; Lap Weld† Black %	3½ to 6 in.; Lap Weld† Galv. %
Lorain, Ohio	29.00	11.75		
Aliquippa, Pa	29.00	15.25	19.50a	5.25a
Sparrows Pt., Md	27.00	9.75	13.50a	+4.25
Benwood, W. Va	29.00	11.75	18.50d	+0.75d
Youngstown, O	29.00	11.75	......	......
Indiana Harbor, Ind	28.00	10.75	18.50ab	+0.75a
Sharon, Pa	29.00	11.75		......
Wheatland, Pa	29.30	11.75	16.50a	+1.25a
Etna, Pa	29.00	15.25	17.50d	3.25d
Fontana, Calif	17.05b	0.25b	8.00ab	+9.25ab

† Threaded and coupled. a 3½ to 4 in. b Continuous weld. c 5 and 6 in. d 6 in.

*‡ Delivered. *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 109.3; Burlington, N. J., 118.1. *b Extra strength ASTM C 200-44T *c 4-in., $90 *d SS361-A *e 30-in. *f 21 in. *g culvert pipe; reinforced, ASTM C 76-41 *h reinforced, ASTM C 75-41 *i reinforced, ASTM C 76-37 *j centrispun; no standard specs. in Canada *k 2% off for cash *l fob plant *m truck delivery *n LCL delivered, fob truck *o listed price based on LCL (no min.) *p freight allowed to destination in city *q ASTM C 13-40 *r CL fob origin, freight allowed *s 2 ft lengths *t 3 ft lengths *u CESA A 60-1941 specs. used *v standard strength *w ss; add 20% for d.s.

*WROUGHT STEEL PIPE: Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft. (*based on approx. $200 per net ton): Butt Weld ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight rates plus 3% transportation tax to get destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 50.25, galv. + 78.50; 1¼ in. black, + 50.25, galv. + 78.0, 1½ in. black, + 46.75 galv. + 74.25; Lap Weld—2½ in. to 3 in. black + 52.50 galv. + 78.50; 4½ in. to 6 in. black + 49.50 galv. + 73.75 Add freight rates plus 3% transportation tax to get destination price.

HOW TO BUILD A LARGER ENGINEERING DEPARTMENT and *not spend a cent* for construction !

Auto-Shift tables save up to 50% floor space!
Make costly new construction unnecessary!
Sharply increase productivity-per-draftsman!

Working space for *just one more* draftsman can cost you over $1500—*unless* you re-equip with Hamilton's remarkable Auto-Shift tables! To give extra draftsmen the working room they need, you can choose between new construction costs averaging $25 a square foot—or Auto-Shift tables, which increase the efficiency of *existing* space up to 50%! Installed in rows, they provide reference surface and drawer right behind each draftsman (see diagram)—so that 250 square feet of space accommodate *two more* Auto-Shifts than separate boards and desks!

What's more, with Auto-Shifts you enlarge your department *overnight*. No costly interruptions for construction. No waiting to add those needed men. Even counting the cost of new tables, savings can amount to thousands of dollars . . . and thousands of man-hours . . . *immediately*.

You save men's energy for better work!

Auto-Shift sharply cuts draftsman-fatigue, steps production 'way up! Counterbalanced top adjusts *instantly* to any desired position—for frequent change of height and slope. This is only one of many Auto-Shift features which keep men happier and more productive on the job—getting the work done faster, easier, and better! Auto-Shift tables pay for themselves many times, in so many ways!

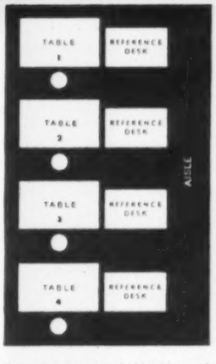
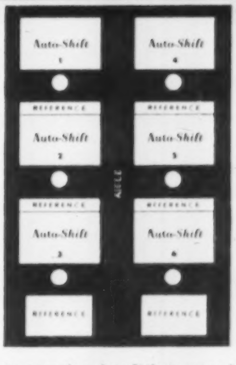


TABLE 1
REFERENCE DESK
TABLE 2
REFERENCE DESK
TABLE 3
REFERENCE DESK
TABLE 4
REFERENCE DESK
AISLE

4 men work at standard tables and desks in about 250 square feet

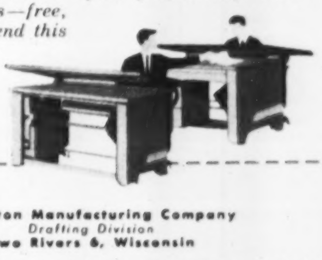

Auto-Shift 1
Auto-Shift 4
REFERENCE
Auto-Shift 2
REFERENCE
Auto-Shift 5
REFERENCE
Auto-Shift 3
REFERENCE
Auto-Shift 6
REFERENCE
REFERENCE
AISLE

6 men work at Auto-Shifts in approximately same area

You can get the whole important story now!

Available right now from Hamilton are all the interesting facts about Auto-Shift tables—their many efficiency and construction features—how they save you money by getting more work done in the space you already have. For complete details—free, without obligation—send this coupon today!

NEW
Auto-Shift



Hamilton Manufacturing Company
Drafting Division
Two Rivers 6, Wisconsin

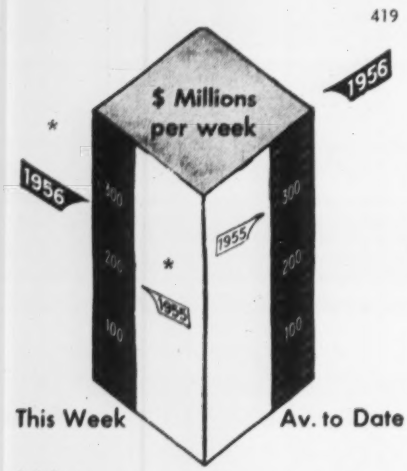
I want more facts on how Auto-Shift tables can save us money and increase draftsmen's productivity. Please send me—without obligation—the whole Auto-Shift story!

Name ____________________
Firm ____________________
Address ____________________
City __________ Zone ____ State ____

Hamilton DRAFTING EQUIPMENT
Hamilton Manufacturing Company, Two Rivers, Wisconsin

Construction Scoreboard

Contract Awards



* 4-days

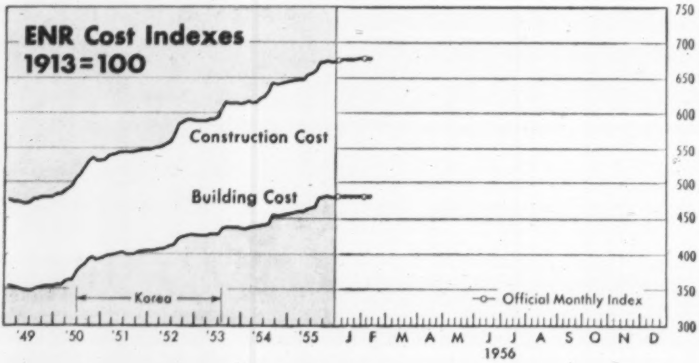
AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 7 wks 1956	Chge %
	$ millions		
Federal	$34.3	$288.0	+19
State and Municipal	83.9	828.2	+49
Total Public	118.2	1,116.2	+40
Total Private	150.1	1,817.8	+43
U. S. Total	$268.3	$2,934.0	+42
By Type of Work			
Waterworks	$9.0	$40.5	—5
Sewerage	6.3	132.5	+172
Bridges	3.1	76.7	+19
Highways	23.7	262.5	+24
Earthwork, Waterways	2.5	84.8	+45
Buildings:			
Public, Excl. Hsg.	16.8	266.3	+27
Public Housing	19.8	62.4	+680
Private Housing	81.2	851.5	+12
Commercial	22.5	353.3	+139
Industrial	32.0	539.3	+74
Unclassified	51.4	264.2	+28
U. S. Total	$268.3	$2,934.0	+42

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

	Week of Feb. 9	Cum. 6 wks 1956	Chge '55-'56 %
	$ millions		
Corporate Securities	$80.4	$200.9	—34
State and Municipal:			
All Except Housg.	88.5	415.5	+4
Housing	6.6	6.6	—80
Federal Loans	1.1	9.8	+23
Federal Aid	...	...	...
Total Nonfederal	$176.5	$632.8	—15
Federal Appropriations:			
In U. S.	...	...	...
Outside U. S.	...	...	...
Total New Capital	$176.5	$632.8	—15



ENR INDEXES (1913=100), 20-cities' average	1956 Feb. 9	% Change from last Month	% Change from last Year
Construction Cost	679.94	+0.2	+5.4
Building Cost	482.91	+0.1	+5.1

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.845. To convert to 1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

CONTRACTS AWARDED Millions of dollars	1956 Jan.	1956 1-Mo.	% Change from '55 Jan.	% Change from '55 1-Mo.
Total U. S., ENR reported	$1,529.8	$1,529.8	+23	+23
Private	866.8	866.8	+ 8	+ 8
Public	726.0	726.0	+48	+48
State & Municipal	531.4	531.4	+63	+63
Federal	194.6	194.6	+20	+20
ENR Volume Index, 1913=100	645	645	+15	+15

NEW CAPITAL FOR CONSTRUCTION Millions of dollars				
Total U. S	387.1	387.1	−25	−25
State & Municipal Bond Sales	261.2	261.2	− 6	− 6
Corporate Security Sales	117.1	117.1	−49	−49
Federal Loans, Aid (nonfed work)	8.8	8.8	+13	+13
Federal Appropriations (fed work)	0.0	0.0	0	0

MATERIALS SHIPMENTS Millions of units		1955 Oct. (O) Nov. (N) Dec. (D)	1955 Mos. (10) Mos. (11) Mos. (12)	% Change from '54 Mo.	% Change from '54 Yr.-Cum.
Portland Cement, Bu Mines	bbls	(N)	(11)		
Port Cem Conc Paving Awards, PCA	sy	8.279(D)	92.829(12)	− 5	+ 9
Fabricated Structural Steel	tons	248(D)	2.982(12)	+11	− 5
Bookings, AISC	tons	368(D)	3.696(12)	+84	+47
Reinforcing Bars, Net, AISI	tons	194(N)	1.971(11)	+39	+21
Lumber, NLMA	ft bm	3,076(N)	36,816(11)	+0.5	− 8
Orders	ft bm	3,160(O)	34,057(10)	− 3	+ 9
Production	ft bm	3,111(N)	36,210(11)	− 1	+ 6
Douglas Fir Plywood, DFPA, av/wk—					
Production	sf on ⅜" basis	95.2(D)	94.2(12)	+11	+28
Orders	sf on ⅜" basis	90.6(D)	92.6(12)	+ 6	+17
Clay Products, Bu Census—					
Brick, Unglazed, Common & Face		637.6(O)	5,950.8(10)	+12	+17
Vit Clay Sewer Pipe	thous tons	171.7(O)	1,599.4(10)	+12	+16
Struc Clay Tile, Ungl	thous tons	73.7(O)	710.5(10)	− 7	− 6
Asphalt Products, Bu Census—					
Asphalt Roofing	sales squares	4.617(N)	60.224(11)	−10	+ 8
Asphalt Siding	sales squares	128(N)	1.219(11)	+ 3	− 9
Aluminum, Wrought, Net, Bu Census—					
Plate Sheet & Strip	lb	138.3(O)	1,266.9(10)	−37	+33
Roll Struc Shapes, Rod, Bar, Wire	lb	30.6(O)	304.9(10)	+13	−0.4
Extr Shapes, Tube Blms, Tubing	lb	71.0(O)	654.1(10)	+45	+59

EMPLOYMENT & FAILURES					
Contract Const Employ, BLS	thous	2,407(D)	2,505(12)*	− 1	− 1
Contractor Failures, Dun & Bradstreet					
Number		136(D)	1,404(12)	+ 5	+ 8
Liabilities	thous	7,341(D)	83,179(12)	+24	+46

* Average per month

Fannie Mae Enters New Era in Housing Field

Mortgage market's "best friend" may be extended soon to aid builders and lenders in construction financing

Government-insured home mortgages are buoyed up by a resilient—and expendable—cushion that can be quickly tailored to any size Congress and the Administration think is necessary to sustain the mortgage market—and hence homebuilding. That cushion is the Federal National Mortgage Association, known unofficially as (1) "Fannie Mae," and (2) as the mortgage market's "best friend."

To credit-harried builders and mortgage-wary lenders, Fannie Mae this week again showed what a good friend it is, when it went into the open market for $100 million in private money to be used for purchase of VA-guaranteed and FHA-insured mortgages. Under Fannie Mae's mortgage-purchase program, builders and lenders can sell their paper to the agency and get money for new lending and new construction.

The money-raising move was made in order to maintain Fannie Mae's steady support of the mortgage market.

Since July 1, 1955, the agency has purchased more than $100 million worth of GI and FHA loans. It has almost exhausted available funds, including $93 million obtained a year ago from the Treasury (in exchange for preferred stock).

Public offerings like this week's issue of 3⅛% nine-month debentures are not government-guaranteed. But they are soundly backstopped by a $1-billion line of credit at the Treasury that can be used if necessary.

• New role for Fannie Mae—Important as the public financing was this week, another development loomed even larger in Fannie Mae's future. Its potential as a mortgage-market cushion was pointed up in a recommendation by a Congressional housing group.

Rep. Albert Rains and his nine-man subcommittee on housing asked the House Banking Committee and Congress seriously to consider permitting Fannie Mae to take up the current slack in construction financing of GI and FHA housing.

A drastic decline in commercial bank funds for building new homes has put a crimp in housing starts since August, when the Federal Reserve Bank of New York cracked down on commitments for so-called "warehousing" of mortgages. (Warehousing in effect, is a process that permits builders and lenders to borrow money to finance construction of houses until the homes are finished and final mortgages can be completed and sold.)

Now the Rains subcommittee wants Fannie Mae again to issue advance commitments for VA and FHA mortgages. Builders and local lenders could borrow from their local banks using the advance commitments as a pledge of security.

The Rains subcommittee doesn't want Fanine Mae to take over the whole burden. It feels that commitments should be on a standby basis with Fannie Mae actually purchasing the mortgages in extreme cases. The subcommittee hasn't yet spelled out the details of its plan but may next week after hearing from some of the Fannie Mae officials.

• Sympathy in the Senate—This proposal strikes a responsive chord on the Senate side. Sen. John Sparkman (D.-Ala.), one of the leaders in housing legislation, also wants to build up Fannie Mae to buttress sagging home construction. But Sparkman regards this as only one step in a much more comprehensive program to "bring in enough private money to finance ever-expanding home construction."

Actually, advance commitments are an old story to Fannie Mae. Within the limits of money authorizations voted by Congress, the agency made commitments on an unrestricted basis for VA and FHA loans until the spring of 1950. The 1950 Housing Law put a stop to the practice.

At the cut-off date, Fannie Mae had almost $1.4 billion worth of commitments on the books. Nearly all of the commitments were cleared during the following two years—with Fannie Mae being called upon to buy most of the mortgages.

Since that time, Fannie Mae's advance commitments have been generally limited to special government housing programs—defense, military and disaster.

These special assistance functions continue under the 1954 Housing Law. Congress has given the President a total of $550 million to apply, at his discretion, to special purposes (including $200 million for military housing and $50 million for cooperatives).

Aside from the special assistance programs, Fannie Mae today has only its separately financed "secondary market operations" to support VA and FHA mortgages. This has been the principal purpose of Fannie Mae from the beginning.

Under the secondary market program, Fannie Mae buys FHA and VA mortgages from eligible lenders who need money to handle more mortgage loans.

Fannie Mae's present mortgage-purchasing operations are somewhat feeble when viewed in the light of its early "free-wheeling" days. At its peak in fiscal 1950, the agency bought nearly $950 million worth of mortgages and sold more than $300 million to investors during the same 12-month period.

Its mortgage buying today is much more restricted. There is a reason for this. Under the 1954 Housing Law, the intent is to convert the secondary market operation into a privately-financed facility (over a period of time).

To accomplish this, every mortgage seller is required to invest 3% of the value of the paper in Fannie Mae non-voting common stock. The seller never sees this 3%—Fannie Mae gives him stock instead. This means that if a builder or banker sells a $10,000 mortgage to Fannie Mae, he gets a check for $9,700 plus $300 worth of Fannie Mae common stock.

In addition, the seller must accept a deduction of ½% to 1% as a purchase fee and he must pay Fannie Mae another 1% if he wants a nine-month option to buy back his mortgage.

These deductions come out of the purchase price—set by Fannie Mae—corresponding to the average market price for the particular class of mortgage in the area where it originated. (For the VA and FHA mortgages that Fannie Mae buys, purchase prices have remained constant at ½% to 5% below par throughout the last year.)

• Stock-buying may be eased—The biggest of the deductions may be cut this year. That is the stock buying requirement. Congress probably will agree with a recommendation by President Eisenhower to reduce the legal

(Continued on page 278)

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The Fannie Mae board, composed of Housing Administrator Albert Cole and four men appointed by him, could then drop the required percentage as low as 1% whenever the Administration wanted to speed up the flow of funds to the mortgage market.

Despite the restrictions and charges, Fannie Mae's secondary market operations are credited with helping housing during last year's tight money situation. More and more mortgages were sold to Fannie Mae as commitments and loan funds became harder to get. Mortgage purchases by the agency rose steadily from $100,000 in February '55, to more than $28 million in December. (They declined last month, indicating some easing in the money market.)

Fannie Mae pricing of mortgages also has had an effect in holding the line against excessive discounting of VA and FHA mortgages. With an assured buyer in Fannie Mae—at a price—local banks and builders have been in a better position when they tried to sell marketable mortgages because Fannie Mae's price acted as a "floor."

On another front, Fannie Mae last fall helped to bolster a faltering mortgage market by stopping sales from its $2.5-billion portfolio of old FHA and VA loans (dated prior to Aug. 2, '54). This huge overhang of seasonal loans threatened new mortgage business. By stopping its sales, private money was diverted into the new loans coming into the market.

Construction Put-in-Place Sets New January Record

Despite a seasonal decline, construction put-in-place set a new record for the month of January, the Department of Commerce and Bureau of Labor Statistics reported last week.

Total for the month was $2,850 million, up 1% over January, '55, the previous record for the month. Several categories set new January records.

Because of a drop-off in homebuilding, the private construction category was down 12% from December, 1955. Public construction showed a seasonal 6% decline.

But industrial building reached the highest level for the month with a total of $228 million. Commercial building was down 7% from December but still managed to post a new record for the month of January.

New January highs also were posted for highways, public schools, sewer and water projects, the government reported.

Jurisdictional conflicts plague AFL-CIO as . . .

Building Trades Assert Their Independence

Jurisdictional conflicts between unions continued to plague the AFL-CIO on several fronts last week as the 29-member Executive Council of the new federation convened for the first time since the merger last December.

At the mid-winter Miami meeting of labor leaders, the strongest voice of all was asserted by the building trades—long a powerful alliance in the ranks of organized labor. In what looks like a bid for power as well as the dollar, the construction unions made it clear that they do not intend to be pushed around in those areas that may well become the critical ones for union affiliates: jurisdiction, organization and political activity.

As the council moved through the first week of its agenda, the major roadblocks to merger harmony appeared to be these:

- Failure of the building trades and the industrial unions to find an acceptable formula for sharing industrial construction and maintenance work.
- Decision on the part of the building trades to run their own show in the drive for new members.
- Disagreement on the proposed activities of the new AFL-CIO Committee on Political Education.

Although these areas of internal disagreement point up again the old rivalries that existed between the AFL and CIO, they are not expected to upset the merger itself. But they do threaten to delay its real effectiveness. On the local level, they demonstrate that many of the still independent and relatively strong affiliates are not yet ready to give the new federation authority to control their destinies.

• Industrial construction—Perhaps the most critical dispute of all is the one in which the building trades and Reuther's auto workers are engaged in Detroit (ENR Feb. 9, p. 82). Its outcome will affect not only the practical ability of craft and industrial unions to live together and to work toward a common goal, but also the success of AFL-CIO's ambitious program to double its membership roll. It will also directly affect contractors across the nation, who have slowly been losing industrial construction and maintenance work to production workers.

The dispute involves conversion work at the Studebaker-Packard plant. Members of the building trades, who had been working side by side with production workers, called a strike, after claiming that the work should be theirs. Efforts to solve the dispute at the local level failed. It was referred last week to the new 14-man committee which was established at the merger convention to work out existing conflicts between the old-line AFL construction unions and the former CIO industrial unions. The committee wrestled with the problem, reached no solution, and tossed it back like a "hot potato" to the Executive Council.

Detroit spokesman for the building trades is James R. Hoffa, a vice president of the strong and ambitious teamsters union. He and building trades president Richard Gray turned thumbs down on Reuther's offer to arbitrate the dispute. Meanwhile appeals from AFL-CIO president Meany to Hoffa for removal of the picket lines have twice gone unheeded.

• Membership drive—Another facet of the jurisdictional conflict appears to lie behind the ambitious organization plan mapped out earlier this month by the building trades. Never before have the construction unions attempted a membership drive on such a grand scale.

Present goal is 1,000,000 new members. Emphasis will be on home building and southern industrial construction. The organizing committee, headed by Richard Gray and Frank Bonadio, contains representatives of the electrical workers, carpenters, teamsters, operating engineers and laborers unions. A $116,000 budget has been set up for a proposed office—to be directed by a yet unappointed coordinator—from which the campaign will be conducted.

In drawing up their own plans, the building trades declined to go along with the new AFL-CIO director of organization, Jack Livingston, who has been working since the merger plans for the biggest organizational crusade in labor's history. He already has a $4-million kitty pledged by former CIO unions.

So far, no timetable has been set for the building trades drive. It is expected to move slowly and to embrace two maneuvers to lessen opposition from nonunion contractors: A no-strike pledge and a willingness to negotiate contracts at less than usual craft wages in lower-pay areas.

The extent to which an independent drive by the building trades will affect Livingston's plans remains to be seen. Last week, it looked like another effort on the part of the craft unions to protect their flanks. At the time of the merger, many said the big AFL-CIO drive would not get underway in fields of conflicting jurisdiction until agreement had been reached in advance on affiliation for new members.

• Political activity—A similar show of independence was made by the building trades last Wednesday when both the teamsters and carpenters unions failed to show up for the organization meeting of the new AFL-CIO Committee on Political Education.

Although Meany reported the sentiment was strong for more political activity than the unions have ever engaged in before, there was disagreement over whether the federation should back any particular Presidential candidate—and disagreement over candidates for other offices.

The building trades, for example, took issue with the committee's proposed opposition to Republican Senator Kuchel of California. Gray's department favors Kuchel because of his efforts of last year to apply the Davis-Bacon Act prevailing wage requirements to the proposed federal highway construction program.

On the legislative goals themselves there was greater unanimity. Biggest targets are right-to-work laws, now on the books of 18 states, and the Curtis-Goldwater Bill recently introduced in the Senate to clip the political wings of unions. The bill would outlaw all contributions made directly or indirectly by unions for political activities.

• Hope for peace—On a broader plane, it looked as if the Miami meeting might lead to another effort to achieve a framework of labor peace between management and labor.

The suggestion has cropped up several times since Meany's initial clash with the National Association of Manufacturers at the time of the merger. Meany had then suggested the possibility of a non-aggression pact

(Continued on page 282)

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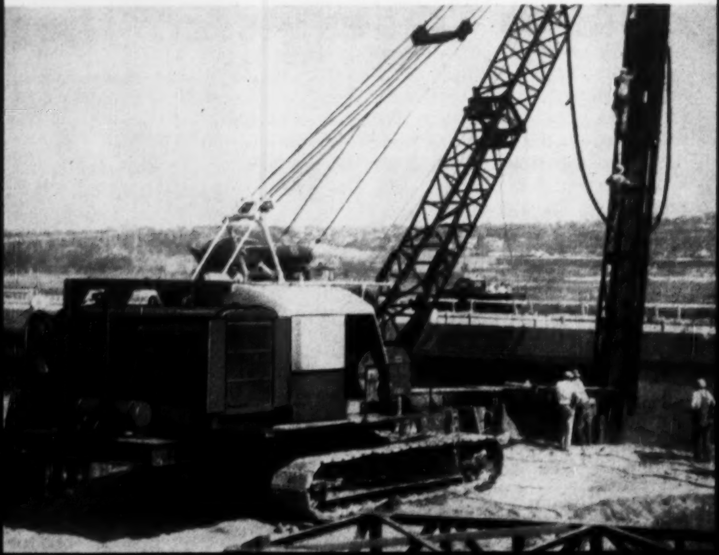

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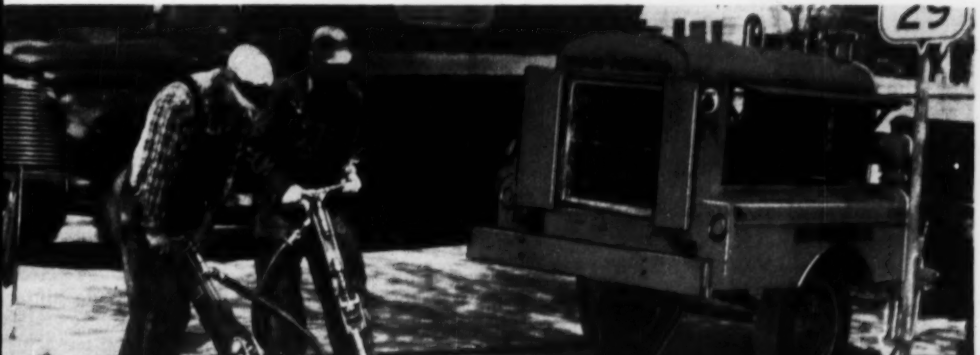

between top-level labor and management, arrived at through a better understanding of each other's problems.

When the issue was raised again last week, Meany was inclined to renew his offer to NAM only on the condition that NAM cease its efforts to promote right-to-work legislation. But at week's end, it looked as if Meany and Charles Sligh, Jr., chairman of NAM's executive committee, would soon meet to explore the possibility of a new approach to industrial peace.

Federal Highway Program: Wage Issue

National committee urges payment of prevailing wages on construction of the interstate phase of proposed system

Inclusion of prevailing wage requirements in the federal highway program now before Congress would benefit the nation as a whole, according to the National Joint Heavy and Highway Construction Committee.

The key highway bill, introduced by Rep. Fallon (D-Md.) for a $51-billion, 13-year highway construction program (ENR Feb. 9, p. 21) was submitted without a prevailing wage provision. Although many feel that the House Public Works Committee will correct the omission—as it did in the Gore Bill last year—the issue will remain a provocative one.

Representing the AFL-CIO carpenters, laborers, operating engineers and teamsters unions, the National Joint Heavy and Highway Construction Committee has urged extension of the Davis-Bacon Act to the proposed 40,000-mi national interstate system only.

The result would be that under the various contracts let for construction of the interstate system, pay scales for construction workers would be at least equal to those prevailing in the locality where the work is performed.

As the highway program is now conceived, a special provision is necessary to bring the construction within the framework of prevailing wages because the Davis-Bacon Act applies only to projects directly undertaken and paid for by the federal government. It's essentially the same as the situations that arose with federally-assisted airport, school, hospital and public housing construction, where prevailing wage requirements were imposed in the legislation authorizing the programs instead of by amendments to the Davis-Bacon Act.

• Reasons advanced—In its analysis of the issue, the committee (chairmanned by Peter Fosco of the laborers union) notes that contractors, local communities and the nation at large—as well as the craftsmen involved—have a "community of interest" in prevailing wage legislation.

According to the committee, use of prevailing wages—now an "accepted principle of federal construction public policy"—grew out of an unattractive situation that preceded passage of the Davis-Bacon Act. The old pattern of federal construction, the committee says, shaped up like this:

- Successful bidders were those who undercut local wage structures and imported labor from low wage areas. Federal construction became a monopoly of a "handful" of out-of-town contractors who competed on the basis of wage differentials rather than ability or efficiency.
- Local contractors could not compete with such practices and lost work in their own areas. At the same time, local craftsmen lost local employment opportunities.
- Purchasing power in local communities was depressed, a spiral of wage-cutting ensued and labor strife became common.

The Davis-Bacon Act was an attempt to correct this situation through use of the prevailing wage requirement. In doing so, the committee says, Congress recognized that public policy as applied to federal construction should embrace:

- Equality of opportunity for all contractors.
- Restriction of competition to ability and efficiency—instead of wage differentials.
- Hiring of local craftsmen for local projects.
- Preservation of local wage structures—which in turn have been developed under another phase of public policy.
- Promotion of industrial peace.

• No higher costs—The committee notes that application of prevailing wages would not increase the cost of highway construction—unless the government seeks to sponsor a cut-rate enterprise. The reason given is a simple one: If Congress enacts the highway bill with a prevailing wage provision, the work will be done under the pay scales already established for the various areas. The machinery for its use is in existence and has been used successfully for the last 25 years.

The committee claims that the interstate phase of the proposed highway program—to be financed by the federal government on a 90-10 basis—is a federal enterprise. It believes that failure to pay prevailing wages for such construction would invite inequity and chaos, as it has in the past, and would repudiate a long-standing and proven principle of public policy.

A Congressional mandate that the highway plan, if approved, be subject to prevailing wage requirements is one of the goals of the Second Annual Building Trades Legislative Conference, now scheduled to be held in Washington, D. C., March 5-8.

Similar in nature to the successful conclave held last year, the conference will afford the construction unions an opportunity to press again for such legislative reforms as repeal of the Taft-Hartley provision—Sec. 14(b)—that supports state right-to-work laws and modernization of the Davis-Bacon Act. As announced at their annual convention last November, the building trades not only seek to extend the Davis-Bacon Act to federally-assisted construction (including insurance and guarantees), but also urge inclusion of fringe benefits as well as basic rates in prevailing wage determinations.

Labor Briefs . . .

• An apprenticeship first—The Tacoma, Wash., Water Division and the plumbers union have developed an apprenticeship training program which they claim to be the first in the nation for a municipal water company. Over a period of three years, apprentices will receive 6,000 hours of experience plus 144 hours of related instruction at Tacoma's Vocational-Technical School.

• Picketing and right to work—Peaceful picketing has been declared a violation of the Arkansas right-to-work law when its purpose is to force a contractor to employ union help or to discriminate against nonunion members. The opinion came from the Arkansas Supreme Court and stemmed from picketing of work being performed by a plumbing contractor.

• No evidence—An anti-trust suit, brewing against members of the plastering industry in Chicago since 1952, has been dismissed for lack of evidence. Allegations of conspiracy had related to control of materials outlets as well as activities directed against out-of-state contractors.

• Union funds for housing—The teamsters union, one of the largest in the nation, will invest between $2 million and $3 million in residential first mortgages in central Arizona.

OFFICIAL PROPOSALS

Bids: March 13, 1956

Contract Exd-130.023

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY BUILDING
EIGHTH FLOOR ALTERATIONS
PAB MANAGER'S OFFICE AND SHOPS

Sealed proposals for performing alterations to a portion of the eighth floor of the Port Authority Building at 111 Eighth Avenue, New York 11, N. Y., will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, March 13, 1956, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, February 16, 1956

Bids: March 1, 1956

New Jersey Turnpike Authority

ADVERTISEMENT FOR PROPOSALS
CONTRACT NO. N-67

Proposals are invited for Contract No. N-67 which involves the construction of water and sewerage systems for Service Area ES and the Holland Tunnel Interchange in Jersey City, all in connection with the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock, Eastern Standard Time, on the morning of March 1, 1956, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after February 9, 1956, at the office of the New Jersey Turnpike Authority, Administration Building, New Brunswick, New Jersey, and at the office of the Consulting Architects, Lorimer & Rose, 254 West 54th Street, New York, N. Y. Contract documents will be furnished upon payment of Ten Dollars ($10.00) for each set, upon application to the Authority. The Payment will not be refunded and contract documents are not required to be returned.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman
February 6, 1956

Bids: March 6, 1956

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR THE
CONSTRUCTION OF
WATER FACILITIES FOR ALCOA AND MASSENA
NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK
SPECIFICATIONS NO. PA-5-11005
ST. LAWRENCE CONTRACT NO. 20

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of Water Facilities for Alcoa and Massena near Massena, St. Lawrence County, New York in the following ways:

(1) If brought in person on the day of receiving bids until 10:30 A. M. Eastern Standard Time on the 6th day of March, 1956, 270 Broadway, Hearing Room C, on the 6th floor, New York, New York.

(2) If mailed in until 10:15 A. M. Eastern Time on the 6th day of March, 1956, at the Authority's office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above.

The principal items of work are:

Estimated:

115,200	cu. yd.	Excavation Common
11,380	lin. ft.	Reinforced concrete pipe-steel cylinder type, prestressed, 48 inch diameter
8,560	lin. ft.	Reinforced concrete pipe-steel cylinder type, prestressed, 30 inch diameter

The work shall be completed on or before October 1, 1956.

Plans, specifications and proposal forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue Toronto 2, Ontario, may be inspected by prospective bidders during office hours and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set and Five ($5.00) dollars per set for additional sets, no part of which will be refunded.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN,
GENERAL MANAGER

PA-5-11005
2/8/56

Bids: March 9, 1956

ADVERTISEMENT

Town of Bethlehem, N. Y.

NOTICE TO CONTRACTORS

Notice is hereby given that sealed bids or proposals in sealed plain wrapper bearing the appropriate identification "Bid for Transmission Main and Distribution Reinforcement, Contract No. 5," will be received by the Board of Water Commissioners at its office in the Town Hall, Town of Bethlehem, Delmar, New York at 7:30 P.M. Eastern Standard Time on the 9th day of March, 1956, and then will be publicly opened and read aloud at a meeting of said Board, to be held at such time and place.

The work includes approximately 800 feet of 24" pipe line from the reservoir dike to the filtration plant; 2300 feet of 16" main from the filtration plant by the softener plant; interconnections between the proposed main and the existing mains in the vicinity of the softener plant; 43,000 feet of 16" transmission main from the softener plant to designated points within the distribution system; various connections between the proposed transmission main and the existing, paralleling transmission mains; Venturi and regulating chambers; 8,000 feet of 12" distribution reinforcement; pavement restoration and other appurtenant work.

Copies of the plans and specifications may be examined at the office of the Town Clerk of the Town of Bethlehem, New York, 393 Delaware Avenue, Delmar, New York, or at the office of the Engineers, Benjamin L. Smith & Associates, 11 North Pearl Street, Albany, New York; copies thereof may be obtained from the Board and/or Engineers upon payment of Twenty Dollars ($20.00) for each set of plans and specifications.

Proposals must be submitted on the blank forms provided and in a manner designated therein. Each proposal must be accompanied by a Bid Bond or certified check in an amount equal to Five Per Cent (5%) of the total bid. The Bid Bond or Certified Checks of all but the three lowest bidders will be returned within ten days after the opening of bids, while the remaining bonds or checks will be returned as soon as a contract has been executed. The Bid Bond or Certified Check of the successful bidder will be retained to pay any loss of damage to Water District No. 1 and/or the Town of Bethlehem, in the event said successful bidder shall refuse or neglect to enter into a contract in accordance with his proposal. Acceptance of the bid will be contingent upon the fulfillment of this requirement by each bidder.

The Board of Water Commissioners reserves the right to consider bids for a period of Forty-Five Days after their opening, and the right is reserved to reject all bids.

BOARD OF WATER COMMISSIONERS,
WATER DISTRICT NO. 1,
TOWN OF BETHLEHEM, NEW YORK
BY: Harold C. Barkhuff, Chairman

Bids: February 21, 1956

New Jersey Turnpike Authority

RE-ADVERTISEMENT FOR PROPOSALS
CONTRACT NO. N-54

Proposals are invited for Contract No. N-54 which involves the application of three (3) field coats of paint to the superstructure steelwork of the Southeast Viaduct, extending from the Bayonne Interchange (Avenue E) to the vicinity of Brown Place; of the five bridge structures extending from Linden Avenue to Phillip Street, namely, Linden Avenue Overpass, New York Port of Embarkation Overpass, Lehigh Valley Railroad Overpass, Ramp B & C Overpass and Central Railroad of New Jersey Overpass; and the Bayview Viaduct, extending from the Jersey City Interchange (Caven Point Road) to Bayview Avenue; and other incidental work, all in Jersey City, Hudson County, New Jersey, and all in connection with the construction of the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

The approximate tonnage of superstructure steelwork that is to receive field coats of paint is 12,452 tons.

Proposals will be received at the New Jersey Turnpike Authority, Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock, Eastern Standard Time, on the morning of February 21, 1956, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after February 1, 1956, at the office of the Authority and at the office of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, New York. Contract documents will be furnished upon payment of Five Dollars ($5.00) for each set, upon application to the Authority. Contract documents are not required to be returned and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman
February 1, 1956

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4634) will be received at Fargo, North Dakota, until March 13, 1956, for furnishing labor and materials for Rehabilitation of the Existing Overhead Ground Wires on the Williston-Garrison 115-Kilovolt Transmission Line, Missouri River Basin Project, North Dakota. Location in Williams, McKenzie, Dunn and Mercer Counties, North Dakota. Principal items are furnishing and installing 617 steel bayonets; 170 miles of line, resagging two ⅜-inch galvanized steel overhead ground wires; furnishing and installing 2,446 sets standard-type, preformed armor rods; furnishing and constructing 20 new double guys; and other work. Completion time 90 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 1993, Fargo, North Dakota; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Bids: February 23, 1956

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 23rd day of February 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

Contract No.	County	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 5, E. G. H. YOUNGMANN District Engineer, 65 Court St., Buffalo 2, N. Y.						
E.T. 56-7 S.T. 56-6 R.C. 56-5	Erie	New York State Thruway—Erie Section—Sub. E-6-A (Four Mile Level Road to Cain Road); Angola-Brant-Farnham, S.H. 642 and 3 Secondary Roads	4 91 (1 45) (Acc.)	9" Two Crse. Cem. Conc. Pavt. 2 @ 25' Wide = 4 89 Miles Asp. Conc., Opt. = 1 06 Miles Asp. Conc., Ty. 2B = 0 24 Mile Misc. Work = 0 17 Mile 4 Hy. Seps. Comp. I-Beams 196 5', 381 8', 329 5' and 337 5'	$185,000 Plans $50	$3,278,000
DISTRICT No. 8, J. S. BIXBY, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
H.T. 56-	Westchester	New York State Thruway—Hudson Section—Subs. 10 and 11 (Tuckahoe Road-Tarrytown) (St. Mary's Cemetery)	.....	Asp. Conc., Opt. and Misc. Work	$1,100 Plans $10	20,000
P.I.P. 56-1 R.C. 56-6	Rockland	Palisades Interstate Parkway, Section 2 (Convent Road to S.H. 689); Spring Valley-Knapps Corners, S.H. 689	3 40 (2 18) (Acc.)	Grading & Structures = 4 25 Miles Asp. Conc., Opt. = 1 16 Mi. 8" Cem. Conc. Pavt. 24' Var. Wide = 0 17 Mi. 5 Hy. Seps. R.C. Rig. Frame Arches, 44', 88', 100.3', 44' and 44' 2 Brs. R.C. Rig. Frame Arches 60' and 60' 1 R.R. Sep. Plate Girder 103 1'	$200,000 Plans $100	3,369,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y.; and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders."

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: March 8, 1956

Contract No. 32

DELAWARE INTERSTATE HIGHWAY DIVISION

NOTICE TO BIDDERS

BRIDGE AND ROADWAY MODIFICATIONS

FOR DELAWARE MEMORIAL BRIDGE AND APPROACHES

Sealed proposals for the construction of bridge and roadway modifications along the approaches to "The Delaware Memorial Bridge" over the Delaware River near Wilmington, Delaware, will be received by the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge near Wilmington, Delaware, until 12 o'clock noon Eastern Standard Time, March 8, 1956, at which time and place said proposals will be opened and read.

The work to be performed under this Contract includes the furnishing of all plant, equipment, materials, labor and all else necessary for the construction of (a) installation of expansion joints and the construction of adjoining slab sections in the concrete pavement adjacent to both abutments of the Delaware Memorial Bridge, the Pennsylvania Railroad Overpass, the New Castle Avenue Overpass and the North and West Bridges of the Farnhurst Interchange, and adjacent to the east abutment of the East Bridge of the Farnhurst Interchange; (b) macadam paving of both outside shoulders for certain lengths adjacent to all the abutments specified in (a) above except those of New Castle Avenue Overpass; (c) repair of roadway expansion joints at both towers of the Delaware Memorial Bridge; and (d) repair of the southwest link of the west tower.

Work on Contract No. 32 shall begin promptly after the execution of the Contract and shall be completed on or before June 15, 1956.

Monthly payment will be made for ninety (90) per cent of the construction completed each month.

Bidders must submit proposals upon forms provided by the Division.

Each proposal must be accompanied by an acceptable surety bond or certified check to the amount of at least ten (10) per cent of the total amount of the proposal.

The Contract will be awarded or proposals rejected within twenty (20) days from the date of opening proposals. The right is reserved to reject any or all bids.

The Plans and Specifications and other contract documents may be examined after February 13, 1956, at the Administration Building of the Delaware Memorial Bridge in New Castle, Delaware. Contract documents may be obtained from the Delaware Interstate Highway Division upon payment of Ten Dollars ($10.00) for each set. Checks shall be made payable to Howard, Needles, Tammen & Bergendoff. Contract documents need not be returned and the above payment will not be refunded.

DELAWARE INTERSTATE HIGHWAY DIVISION
by: Garrett E. Lyons, Director
W. B. McKendrick, Jr., Chief Engineer
Delaware Interstate Highway Division
February 9, 1956

Bids: March 12, 1956

Water Treatment Plant

ADVERTISEMENT FOR BIDS

Sealed bids or proposals for furnishing materials and labor for constructing a Water Treatment Plant for the City of Ashland, Kentucky, will be received by the City Manager, City Building, Ashland, Kentucky, until one o'clock (1:00) P.M., Eastern Standard Time, March 12, 1956, when said proposals will be publicly opened and read in the Chambers of the City Commission, City Building, Ashland, Kentucky.

This work will be known as "Water Treatment Plant" and includes the construction of reinforced concrete basins, building substructures, building superstructures, piping, valves, water treating equipment, and filters and appurtenances.

Each proposal shall be addressed to the "City Manager, City Building, Ashland, Kentucky," sealed and endorsed "PROPOSALS FOR WATER TREATMENT PLANT."

Each proposal must be made on a blank proposal form for such purpose and must contain the full name and address of each person or company interested. The proposal shall be accompanied by a bond in the sum of ten per cent (10%) of the bid satisfactory to the City of Ashland or by a certified check in the sum of ten per cent (10%) on some solvent bank as a guaranty that if the bid is accepted a contract will be entered into and its performance properly secured within ten days after written notification of acceptance is sent. Proposal bonds shall be accompanied by proof of authority of the official or agent signing the bond together with a recent financial statement of the surety company.

The check of the successful bidder will be returned if the contract is executed and the necessary bond furnished, and to the unsuccessful bidders after award is made.

The City of Ashland, through its City Manager, reserves the right to accept any bid or reject any or all bids should it deem it to be for the best interests of the City of Ashland, Kentucky.

Plans, specifications, and form of proposal and contract may be obtained at the office of the City Manager, Ashland, Kentucky, or Alfred LeFeber & Associates, Consulting Engineers, 2933 Woodburn Avenue, Cincinnati 6, Ohio, upon deposit of $25.00 for each set of documents so obtained. The full amount of the deposit for one set of documents and one-half of the deposit for any additional sets of documents will be refunded to each bidder who submits a formal proposal to the City of Ashland, Kentucky, and who also returns the plans and specifications (on additional sets) in good condition to the Engineer within ten (10) days after his bid security has been returned to him.

Equipment manufacturers, sub-contractors, and others who do not submit formal proposals to the City of Ashland, Kentucky, will be refunded one-half (½) the amount of the deposit for all sets of complete documents including plans and specifications returned in good condition within ten (10) days after the opening of bids. No refund will be made for documents received after this ten (10) day period.

The City of Ashland reserves the right to hold all bids for thirty (30) days before final acceptance thereof.

CITY OF ASHLAND, KENTUCKY
By: J. P. Brownstead
City Manager

U. S. Government

Department of Commerce, Bureau of Public Roads, February 6, 1956. SEALED BIDS will be received at the office of the Division Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., E.S.T. MARCH 6, 1956, for Project 1D16, Colonial Parkway, Bridge under Tazewell Hall Avenue in Williamsburg, James City County, Virginia. Construction of Brick-faced Concrete Arch Overpass Structure, and other work. The approximate quantities of the more important items are: 1,060 cu. yd. Concrete, 160,000 lb. Reinforcing Steel, 200 cu. yd. Brick Masonry. Minimum wage rates have been fixed as required by law. Plans, specifications, and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Division Engineer.

OFFICIAL PROPOSALS

Bids: March 12, 1956

ADVERTISEMENT FOR BIDS

Intake Pier and Pump Station

Sealed bids or proposals for furnishing materials and labor for constructing an Intake Pier and Pump Station for the City of Ashland, Kentucky, will be received by the City Manager, City Building, Ashland, Kentucky, until one o'clock (1:00) P.M., Eastern Standard Time, March 12, 1956, when said proposals will be publicly opened and read in the Chambers of the City Commission, City Building, Ashland, Kentucky.

This work will be known as "Intake Pier & Pump Station" and includes the construtlon of reinforced concrete intake pier, brick superstructures, access bridge, piping, valves, pumps, meter and appurtenances.

Each proposal shall be addressed to the "City Manager, City Building, Ashland, Kentucky," sealed and endorsed "PROPOSAL FOR INTAKE PIER & PUMP STATION."

Each proposal must be made on a blank proposal form for such purpose and must contain the full name and address of each person or company interested. The proposal shall be accompanied by a bond in the sum of ten per cent (10%) of the bid satisfactory to the City of Ashland or by a certified check in the sum of ten per cent (10%) on some solvent bank as a guaranty that if the bid is accepted a contract will be entered into and its performance properly secured within ten days after written notification of acceptance is sent. Proposal bonds shall be accompanied by proof of authority of the official or agent signing the bond together with a recent financial statement of the surety company.

The check of the successful bidder will be returned if the contract is executed and the necessary bond furnished, and to the unsuccessful bidders after award is made.

The City of Ashland, through its City Manager, reserves the right to accept any bid or to reject any or all bids should it deem it to be for the best interests of the City of Ashland, Kentucky.

Plans, specifications, and form of proposal and contract may be obtained at the office of the City Manager, Ashland, Kentucky, or Alfred LeFeber & Associates, Consulting Engineers, 2933 Woodburn Avenue, Cincinnati 6, Ohio, upon deposit of $20.00 for each set of documents so obtained. The full amount of the deposit for one set of documents and one-half of the deposit for any additional sets of documents will be refunded to each bidder who submits a formal proposal to the City of Ashland, Kentucky, and who also returns the plans and specifications (on additional sets) in good condition to the Engineer within ten (10) days after his bid security has been returned to him.

Equipment manufacturers, sub-contractors, and others who do not submit formal proposals to the City of Ashland, Kentucky, will be refunded one-half (½) the amount of the deposit for all sets of complete documents including plans and specifications returned in good condition within ten (10) days after the opening of bids. No refund will be made for documents received after this ten (10) day period.

The City of Ashland reserves the right to hold all bids for thirty (30) days before final acceptance thereof.

CITY OF ASHLAND, KENTUCKY
By: J. P. Brownstead
City Manager

Bids: February 20, 1956.

Board of Education—Bureau of Construction

NOTICE RE PREQUALIFICATION FORMS FOR CONTRACTORS

NOTICE IS HEREBY GIVEN THAT THE Director of the Bureau of Construction, 4th Floor, 42-15 Crescent Street, Long Island City 1, New York, will recieve applications for prequalification of bidders, from contractors who may wish to submit bids for the proposed hereinafter specified contracts, as follows:

For general construction, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures for a new third story addition to P.S. 165 Queens, 70th Road and 150th Street, Flushing.

Prequalification application forms will have to be secured from and must be submitted to the Director, Bureau of Construction Office, 4th Floor, Room 107 42-15 Crescent Street, Long Island City, New York.

Bids when advertised will be received from prequalified bidders only.

OFFICIAL PROPOSALS

The time for submitting prequalification application forms for the above contracts will expire on Monday, February 20, 1956.

WILLIAM H. CORREALE
Director

Dated. February 8, 1956.

U. S. Government

Invitation for bids (Construction Contract) Date, February 3, 1956. Name and location of project, Project number 53-106R Waterfront Roadway, St. Thomas, Virgin Islands. Department or agency Government of the Virgin Islands by (issuing office) department of Insular Affairs, Division of Procurement and Supply, Charlotte Amalie, St. Thomas, Virgin Islands. Sealed bids in single copy for furnishing all labor, equipment, and materials and performing all work for the project described herein will be received until 3:00 P.M., Atlantic Standard Time, March 28, 1956 in the Department of Insular Affairs, Division of Procurement and Supply, Charlotte Amalie, St. Thomas, Virgin Islands, 75 Kronprindsens Gade, (opposite of the Catholic School.) and then publicly opened. Information regarding bidding material, bid guarantee, and bonds, plans and specifications and other contract documents are open for public inspection at the office of the Public Works Commissioner, Charlotte Amalie, St. Thomas, Virgin Islands; R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama; Lester M. Marx, Deputy Public Works Advisor, Office of Territories, Department of the Interior, Room 2713, Interior Building, Washington 25, D. C.; A.G.C. Office, 1113 Congress Building, Miami, Florida; Builders Exchange, 46 Northeast 6th Street, Miami, Florida; Urban Renewal Administration, 2nd Floor, del Valte Building, Santurce, 17, Puerto Rico; and F. W. Dodge Corp., 119 West 40th Street, New York 18, N. Y. Plans and specifications may be procured from the Office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama, upon deposit of $20.00. Deposit shall be only by certified check payable to R. L. Kenan & Associates, which will be refunded to bona fide bidders upon the return of plans and specifications in good condition within sixty (60) calendar days from the date of bid opening. A bona fide bidder includes any person who submits a bid for a general contract, but does not include a person who submits a quotation to the general contract bidders. To persons who procure plans and specifications upon payment of $20.00 and who do not submit a bid, $15.00 will be refunded upon the return thereof in good condition within sixty (60) calendar days from the date of bid opening. No refund will be made for return after that time. After the bid opening additional copies of plans and specifications may be obtained from the Consulting Engineers at commercial rates, plus handling and mailing charges. Bonds, etc. Each bid must be accompanied by a satisfactory bid guaranty in an amount not less than 5 per cent of the total bid. The successful bidder will be required to furnish a performance bond and payment bond, each in the amount of 100 percent of the contract price. No bid may be withdrawn until forty-five (45) calendar days after the scheduled closing time for the receipt of bids. The Government of the Virgin Islands reserves the right to award a contract for any or all items of any bid, whichever course is in the best interests of the Government of the Virgin Islands. Description of Work. The construction of a roadway approximately 7,830 feet long along the seawall in Charlotte Amalie harbor which includes: 13,500 C.Y. common excavation, 4,700 C.Y. solid rock excavation, 1,434 L.F. culvert pipe, 38 Ea. roadway inlets, 12,900 L.F. standard combination curb and gutter, 280 C.Y. rubble masonry curb wall, 2,460 S.Y. grouted riprap, 6,330 S.Y. concrete sidewalk, 25,700 S.Y. dry macadam base course, 25,700 S.Y. 2" bituminous surface, 4 Ea. comfort stations (toilets), lighting. With Alternates: 25,700 S.Y. stabilizing subgrade, 25,700 S.Y. concrete paving.

Sealed bids for the purchase of floating equipment offered for sale by Panama Canal Company will be received in the office of Procurement Officer, 21 West Street, New York 6, N. Y., until 10:30 A.M., E.S.T., April 6, 1956, and at that time publicly opened. This equipment, covered by Invitation No. 235, consists of hydraulic grader, air compressor barge, relay pump barge, and one 1200 ton silt barge. If complete brochure and bid forms are desired, contact Procurement Officer, Panama Canal Company, 21 West Street, New York 6, N. Y. BO 9-5380.

EMPLOYMENT OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Heavy Construction Superintendent considerable experience heavy concrete work, sewerage & waterworks construction, general heavy underground work in N. Y. State. Must be thoroughly competent, able to assume responsible position. Engineering background preferred. Start immediately. Permanent position with advancement for qualified person. P-8926, Engineering News-Record.

Superintendent for earth moving and rock excavation to be located in New York and neighboring states. Must be experienced with all phases of earth moving. Salary open. P-8845, Engineering News-Record.

Wanted: Bridge & Highway designers with office and field experience by consulting engineering firm in Pennsylvania. Give complete details and salary desired. P-8381, Engineering News-Record.

Having opening for well qualified bridge foreman and superintendent in Florida. Apply to P-9239, Engineering News-Record, giving complete background, references, salary desired, etc.

Estimator: Midwestern Building Contractor. Position permanent, opportunity excellent. Furnish experience record, salary desired, address. P-9182, Engineering News-Record.

Excellent permanent opportunity for qualified office man, under 35, with accounting training and experience in construction, but latter not essential. College graduate preferred. Send experience record to Cunningham Brothers, Inc., General Contractors, Beloit, Wisconsin.

Male Help Wanted: Experienced structural steel detailers. Only men experienced in making detail drawings for fabricating shop need reply. Excellent working conditions with opportunity for advancement for good men. Give references and salary expected in application. Southern Engineering Company, Charlotte, N. C.

Engineer-Estimator—Familiar with highway procedures, practices and administration. Position in office of progressive general contractor in Central Ohio. Permanent and immediate. P-9043, Engineering News-Record.

Teaching positions available in civil, mechanical engineering. Write Administrative Dean, Fresno State College, Fresno 4, California.

Estimator—With field experience on heavy construction work and underground utilities such as water and sewage treatment plants; pumping stations; excavation and earth moving jobs; sewer and water lines; site work; drainage, etc. Reply by letter to Virginia Engineering Company, Inc., General Contractors, Newport News, Virginia, giving field and office experience, age, education, phone number, salary, when available, etc. Permanent position for man meeting our requirements.

Four Salesmen: To sell concrete form accessories and tubular scaffolding—in Chicago, New York, Houston & Los Angeles. Must be experienced and thoroughly acquainted in area. Protected territory. Liberal commission against guaranteed draw. Give full details. Confidential. This is the chance of a lifetime for right man. Write P-9039, Engineering News-Record.

Graduate engineer, mechanical or civil, with actual job operational experience with major national construction or engineering firm or marine construction firm for sales engineering position representing American Hoist & Derrick Company in the Texas, Louisiana and Tennessee area. Send complete confidential resume to the President, American Hoist & Derrick Company, St. Paul 1, Minnesota.

Wanted: Highway and structural draftsmen for work on expressways with N.Y.C. consulting engineers. Recent graduates considered. P-9188, Engineering News-Record.

(Continued on following page)

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant **Civil Service Opportunities . . .** **Employment Agencies**
Positions Wanted **Selling Opportunities Wanted** **Employment Services**
Part Time Work **Selling Opportunities Offered** **Labor Bureaus**

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Subject to Agency Commission.

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Send NEW ADS to ENGINEERING NEWS-RECORD, 330 W. 42nd St., N. Y. 36, N. Y. for March 1st issue closing February 27h

POSITIONS VACANT

(Continued from preceding page)

Graduate Engineers under 30: with military service completed. Excellent opportunities in both field and office for training and rapid advancement. Starting salaries dependent upon experience. Send complete information and recent photograph. Dondlinger & Sons Const. Co., P.O. Box 2033, Wichita, Kansas.

Structural designers and draftsmen with at least two years recent experience in engineer's office. Miami location with good opportunities. Give complete information and salary desired. P-9192, Engineering News-Record.

Wanted: Experienced highway and structural engineers for work on expressway design with N. Y. C. consulting engineers. P-9185, Engineering News-Record.

Paving Engineer—Overseas Airbase. Mild climate. High salary. Family Accommodations available. Patchen & Zimmerman Engineers, 140 Nassau St., N. Y. 38, N. Y. COrtlandt 7-0322.

Structural Steel Draftsmen. Excellent opportunity for two experienced structural steel detailers with progressive Mid-West fabricating plant. Five day week, generous fringe benefits. Send brief resume of training and experience to P-9229, Engineering News-Record, including salary requirements. Company will arrange for personal interview and pay moving expenses for qualified applicants.

General Superintendent to assume complete charge of all field operations building contractor located Northern Ohio. Please give age, experience, references and salary desired. Want top man only. P-9205, Engineering News-Record.

Structural Engineers and Draftsmen of various degrees of training and experience for work on bridges. Location Midtown New York City. State qualifications, age, salary, and availability. P-9254, Engineering News-Record.

Designers and checkers also squad leaders steel or concrete. For expanding organization on industrial and power plant work. Overtime and advancement, liberal benefits. Marbarry Corp., 140 Nassau Street, N.Y.C., COrtlandt 7-0322.

Structural Steel Detailers, experienced and responsible men of $3.50 to $4.00 per hour calibre, urgently needed. Heavy overtime. Write listing background and salary expected. Alster & Assoc., 29 E. Madison St., Chicago 2, Ill.

Engineers experienced in design and supervision of construction to work as resident engineers or prepare plans for water and required, when can report, and give references. sewer systems. State experience, age, salary Reply P-9290, Engineering News-Record.

Asphalt paving foreman, young, able to assume responsibilities. Salary based on experience, highway department background helpful. Northern New Jersey. P-9292, Engineering News-Record.

Paving Constuction Superintendent

wanted for highway and municipal paving work principally in Iowa. Yearly employment to right man.

P-9252, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS VACANT

Senior Cost Engineer familiar with the Uniform System of Accounts for Electric Utilities. Duties will consist of analyzing completed major construction projects for an Electric Utility. Experience with the Federal Power Commission or a State Public Service Commission would be desirable. Some experience with the property record department of any electric utility would also be an asset. Indianapolis Power & Light Company, Employment Department, 1230 West Morris Street, Indianapolis, Indiana.

Chief of Party—Must be capable of handling survey parties and have thorough understanding of survey work pertaining to rights of way, curb and street lines, sanitary and storm sewer surveys, and general survey work. Apply by appointment—Office of Howard Madison, Township Engineer, 1 Main Street, Woodbridge, N. J., between 9 A.M. and 5 P.M.

Transit Man—For inside and outside work. Must have thorough knowledge of engineering, drafting and calculating, and be thoroughly familiar with deed and conveyance, and tax map work. Apply by appointment—Office of Howard Madison, Township Engineer, 1 Main Street, Woodbridge, N. J., between 9 A.M. and 5 P.M.

Estimators for all trades. Relocation unnecessary. Good pay plus profit dividends. Address resume and references to Construction Survey Co., 101 Park Avenue, N. Y. 17.

Sales Representative for A-1 all-trade estimating service in your town. Commission plus profit dividends. Send resume and references to Construction Survey Co., 101 Park Avenue, N. Y. 17.

Estimator—Company doing diversified business in industrial, commercial, institutional, and residential construction solicits inquiries and resumes from experence building estimators. Continuous employment is offered to qualified applicant. Age limit 42; Location—Central and Western Florida. State salary requirements and availability date. Charles Construction Corp., P. O. Box 112, St. Petersburg, Fla.

Civil Engineers — Senior — Junior — College graduates—by established public utility supervisory-consulting organization. Senior—minimum 7 years experience—Junior—minimum 3 years, for work in connection with design hydro systems, also structural and foundations for steam, hydro, and diesel plants. Location New York—some travel future. Reply stating age, education, experience, personal particulars and minimum salary expected. P-9278, Engineering News-Record.

EMPLOYMENT SERVICE

Salaried personnel, $5,000-$30,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Superintendent of construction at present in charge of erection of large atomic reactor, will be available on completion for reengagement in similar field. Competent to take charge of project domestic or foreign. Write PW-9017, Engineering News-Record.

1 Office Engineer
1 Resident Engineer
1 Draftsman

Positions available for men with experience in hydraulic and sanitary engineering. Water supply, sewerage and drainage projects.

Submit experience record, references, date available, age, and salary requirements.

ELSON T. KILLAM
Hydraulic and Sanitary Engineers
529 Millburn Ave. Short Hills, New Jersey

POSITIONS WANTED

Responsibility and Advancement sought by P.E. age 26, with experience in sewers, drainage, roads, surveying, structures. C.E. Master's degree. Capable all phases office work, supervision, contact with people. PW-9210, Engineering News-Record.

Estimator, Chief, heavy construction. Foundations, excavation, concrete structures. Construction problems requiring ingenuity. For progressive contractor or consultant with contractor's cost viewpoint. Broad experience in New York area. PW-9230, Engineering News-Record.

Purchasing agent—7 years major company on power plant projects. Experience purchasing all types materials and equipment also expediting, traffic, warehousing and stores control. Desires permanent location. Age 32, college, family. PW-9231, Engineering News-Record.

Master Mechanic or Equipment Supt. heavy earth moving, concrete and asphalt plant erection, experienced in all phases of repair, operation, maintenance and shop management of heavy equipment. PW-9170, Engineering News-Record.

Proj. Mgr. or Gen. Supt.—Extensive exper. industrial and chemical plant const. Have proven record. Available now. PW-9204, Engineering News-Record.

Engineer, registered, aggressive—8 years mech-struct design and installation, desires responsible position with engineer or contractor-engineer. Resume on request. PW-9171, Engineering News-Record.

Proven executive engineer available soon for managerial, operational, marketing, or pioneering position with firm desiring development of business in inland southwestern states. B.S., bilingual, much travelled. Write aims to PW-9233, Engineering News-Record.

Mech. Struct. Des. engr. conveyors machinery struct, steel bldgs. hvy. equipt. etc. PW-9288, Engineering News-Record.

Chief Engineer & Estimator—Age 52, 30 years top flight successful experience mostly in competitive building field. Have had full responsibility for preparation of estimates on large jobs for many years with very successful record profitwise. PW-9284, Engineering News-Record.

Superintendent: Am 46 years of age, sober and qualified to handle any size of road or grading job. If interested write salary and proposition, I will be glad to furnish sufficient reference. Have been superintendent for approx. 20 years. PW-9253, Engineering News-Record.

Senior Estimator desires association with reliable general contractor; age 28; salary $700/mo. PW-9282, Engineering News-Record.

Structural Engr., BCE, PE, 15 yrs. experience building construction, administrative, design, estimating, detailing. Present position 10 yrs. Desires responsible position with future. PW-9280, Engineering News-Record.

SELLING OPPORTUNITY WANTED

Manufacturers Representative, former sales executive, civil engineer, available construction items in California, local background. RA-9281, Engineering News-Record.

WORK WANTED

Detailers—Experienced in all phases of strct. & misc. steel detailing, available to handle add. work for fabricator. S. Kuchma Co., 2555 Dorr St., Toledo 7, Ohio.

ENGINEERS

HIGHWAYS AND BRIDGES

Designers
Draftsmen
Office Engineers
Maintenance Engineers
Project Engineers
Location Engineers
Soils & Materials Engineers

Domestic and Overseas Assignments
Knowledge of Foreign language necessary in some classifications.

ARCHITECTS

Architectural Draftsmen

Write, giving full particulars concerning education, experience, personal history and availability to:

Richard L. Shaw
Personnel Director

Michael Baker, Jr., Inc.
Consulting Engineers
Baker Building **Rochester, Penna.**

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Qualified electrical, structural, mechanical, and architectural

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Excellent salaries, all fringe benefits, good working conditions, high management cooperation and above all, magnificent advancement opportunities for career minded

ENGINEERS

Engineers who wish to investigate these opportunities should submit a resume stating their education, experience and salary requirements to:

THE H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS
1783 East 11th Street Cleveland 14, Ohio

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STRUCTURAL
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Bridges, Expressways, Turnpikes

PERMANENT POSITIONS DEPENDING ON EXPERIENCE AND ABILITY

PAID VACATION, SICK LEAVE HOSPITALIZATION, LIFE INSURANCE

INCLUDE EDUCATION, EXPERIENCE, REFERENCES AND SALARY EXPECTED IN APPLICATION LETTER

Howard, Needles, Tammen & Bergendoff
55 Liberty St. **New York 5, N. Y.**

DESIGN ENGINEERS

CIVIL-Graduate, with minimum of 3 years experience in design of highways, streets, drainage or sanitary works.

STRUCTURAL-Graduate, with minimum 3 years experience in design of heavy engineering construction.

DESIGN DRAFTSMAN-Minimum 2 years experience in highway or heavy structural engineering projects.

COMPANY PAID HOSPITALIZATION, LIFE INSURANCE, RETIREMENT PLAN, AND VACATIONS.

SEND RESUME, REFERENCES, AND SALARY REQUIREMENTS TO:

PALMER AND BAKER, INC.
Consulting Engineers
P. O. Box 346 **Mobile, Alabama**

CONSTRUCTION
DEVELOPMENT
ENGINEER

An experienced and ingenious construction engineer, dedicated to the principle that labor productivity can be improved through the development of special tools, jigs and fixtures, will find in this opening an excellent opportunity with a leader in the construction of petroleum and chemical plants throughout the world. It is an unusually opportune home office assignment involving ample contacts in the field. All inquiries in confidence. Please send complete resume of experience and salary desired.

P-9220, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

WANTED: ASS'T TRAFFIC ENGR.

For traffic engineering department just recently established. Salary range $554 to $670 a month with maximum salary obtainable through annual and longevity increases. Registration as a professional engineer required. Applications accepted until the needs of the service are filled. Write Personnel Department, City Hall, Madison 3, Wis.

DESIGN ENGINEERS

McKEE's expansion program has created many new openings in our Refinery, Metals and Industrial Divisions.

These are permanent positions with excellent opportunities for advancemen in one of the world's largest engineering organizations.

With a fifty-year history of successful operation and continuous growth, McKee designs and constructs Petroleum Refineries, Chemical Plants, Blast Furnaces, Steel Plants, Ore preparation Facilities and Industrial Plants all over the world. This wide diversification offers a variey of opportunities to qualified engineers, with no age limitations, in the following fields:

PIPING LAYOUT, STRUCTURAL STEEL, CONCRETE, PROCESS HEATERS, EQUIPMENT SPECIFICATIONS, LAYOUT AND PROCESS DESIGN. ALSO ELECTRICAL AND PIPING DRAFTSMEN.

McKee offers you top compensation for your work plus the security of a life-time pension. Other benefits include insurance, hospitalization, training program and paid vacations.

Ideal working conditions are provided in large, well-lighted, air-conditioned quarters furnished with the most modern equipment. Ample free parking space is available on the premises.

Adequate housing in good residential communities is available in Cleveland and surrounding suburbs. Excellent schools and colleges offer educational advantages. McKee makes generous allowances for transportaion and moving expense. Interviews will be arranged for those who qualify. Reply by letter giving education and experience. All letters will be answered and kept strictly confidential. PLEASE WRITE TO:

Edward A. Kolner

ARTHUR G. McKEE & COMPANY
2300 Chester Avenue
Cleveland 1, Ohio

WANTED Eastern Distributor

**TO PLACE ACCOUNT IN KEY CITIES
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Construction Equipment

National Manufacturer of Construction Equipment product wants a Company or Individaul to represent us as our Distributor for the North Central and North Eastern portion of U. S. The following qualifications are necessary: Show financial responsibility and have a thorough knowledge of how to sell Contractors and the ability to train and assist Dealer's Salesmen. Our product is widely used on dams, tunnels, highways and heavy engineering jobs. The Distributor selected will be thoroughly schooled in our product and its application, and we will assist him in getting dealer organization started.

**RW9295, "ENGINEERING NEWS-RECORD"
330 West 42nd Street, New York 36, New York**

MECHANICAL EQUIPMENT SPECIALIST

Graduate Mechanical Engineer with a minimum of 7 years' experience in the selection, design, operation and maintenance of heavy industrial mechanical equipment. This includes Diesel engines, compressors, pumps, turbines, and other related machinery for oil refinery, power plants and oil producing facilities. Good industrial contacts required. For New York Engineering Department, but job requires occasional travel to Europe and the Middle East.

Salary commensurate with experience and training. Liberal benefit program. Write outlining personal history and work experience.

Recruiting Supervisor, Box 112

**ARABIAN AMERICAN
OIL COMPANY
505 PARK AVENUE
NEW YORK 22, N. Y.**

CONSTRUCTION LABOR ESTIMATOR

Highly responsible staff position, in headquarters of a company recognized world-wide for its achievements in chemical plant construction, for a graduate engineer with a thorough background in construction cost estimating and particularly well versed in the preparation of labor predictions for the erection of concrete, piping, insulation and instrumentation. He should also be experienced in the analysis of labor costs.

This is a challenging opportunity for the man who is seeking future growth and professional development. Please submit details of experience and salary desired. Replies held in confidence.

P-9221, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

DIRECTOR OF PUBLIC WORKS

For City
North Sacramento, California

(Population 9085)

Invites applications from Civil Engineers. Salary $600.00 to $720.00. Qualifications to include: Drainage, Highway, Sewerage, Administrative Experience, and California License. Contact City Manager, City Hall, North Sacramento 15, California

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Due to our expansion program, the following permanent positions are available in a large pulp and paper manufacturing plant in the Upper Midwest:

Design and Construction Estimator
Instrumentation Engineer
Piping Design and Layout Engineer
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P-9199, Engineering News-Record
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P-9234, Engineering News-Record
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P-8825, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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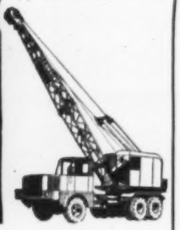

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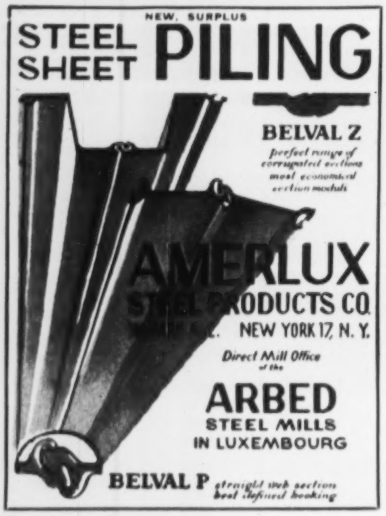

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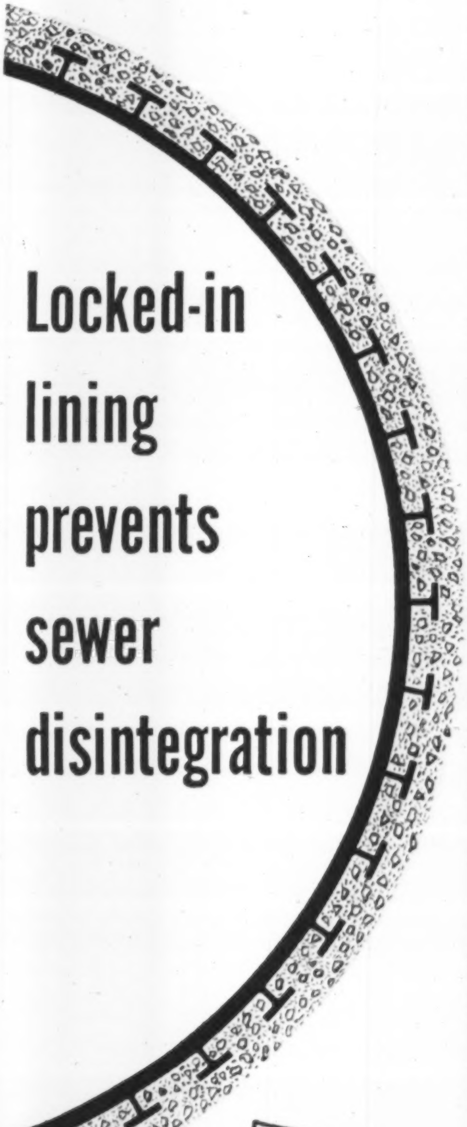

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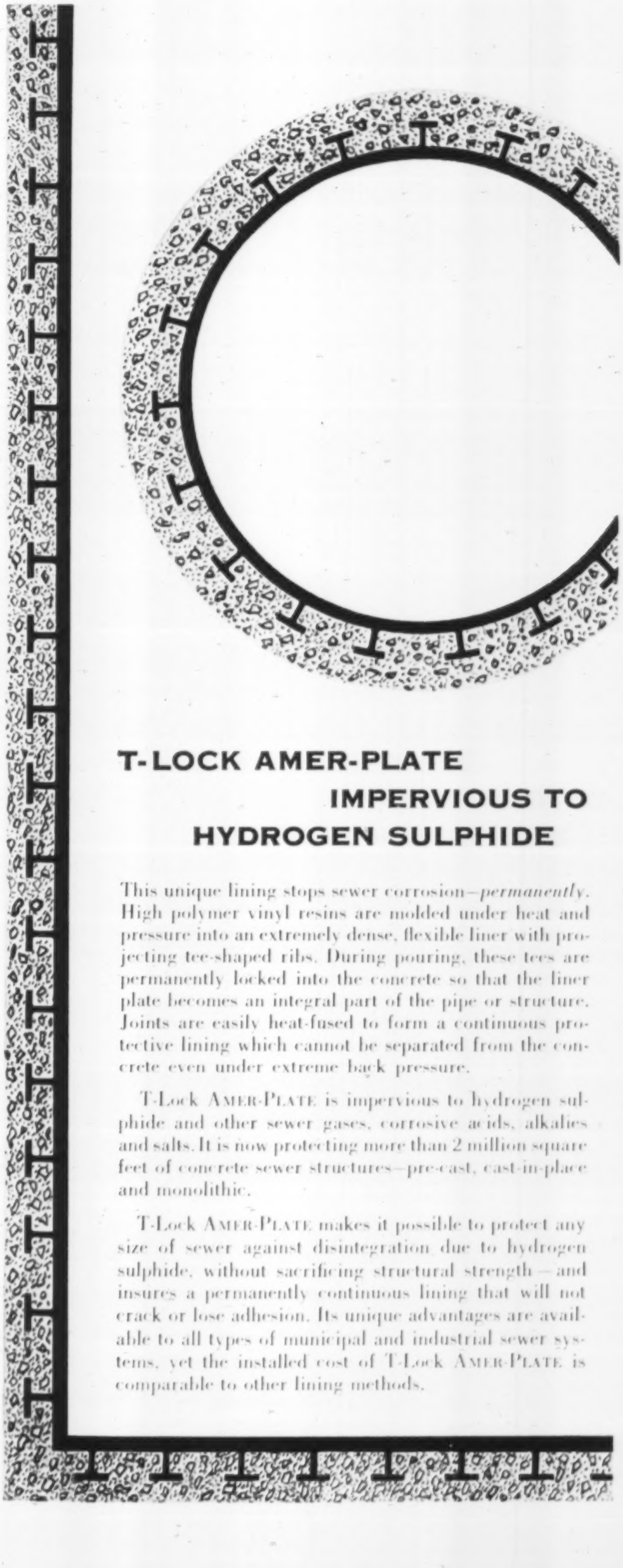

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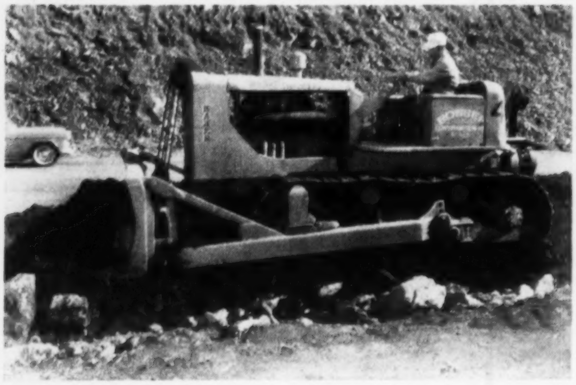

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